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TELEPHONY

The Journal of the Telephone Industry

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FLASHES AND PLUGS

STICKY SOUNDS. An American guard at the Japanese war crimes trial has reported that his superior officer "chewed me good" for putting chewing gum in ex-Premier Hideki Tojo's earphones.

"I don't know what is going to happen now," said Pfc. William C. Smith, a lanky 18-year-old mountaineer from Eureka Springs, Ark. "But as for chewing gum, I guess I will give that up for awhile."

Another guard finally had to remove the gum so Tojo could hear the courtroom proceedings.

• • •

BUSINESS AND BROMOS. Customers at the fountain of a Beverly Hills, Calif., pharmacy have no qualms about missing important messages. Portable telephones are available for connection to any seat.

• • •

MILESTONES OF PROGRESS. The centennials of three Americans, each of whom invented a new use for electricity, fall within a six-month period. Each man's name is inseparable from his product—"Bell" telephone, "Edison" light, "Westinghouse" electric. A description of the force with which they all worked is carved over a portico of the Union Station in Washington, D. C.

"Electricity—
Carrier of light and power
Devourer of time and space
Bearer of human speech over land and sea
Greatest servant of man; itself unknown."

• • •

AH, WILDERNESS! Personnel of the Kenya & Uganda Railway in East Africa may have few problems in common with employes of the Atchison, Topeka & Santa Fe, but they're not entirely carefree. Giraffes tampering with the telephone wires often complicate train operations.

• • •

"UGH." Paleskin pride took a scalping in the state of Washington recently. Seems that not all native Americans are confirmed telephone addicts.

When the newly installed telephone switchboard between Nespelem and Spokane was being ceremonially opened, two Indian chiefs, Billy Curlew and Peter Dan Mosse, both stoutly declared that they preferred the "moccasin telegraph." They had been invited to appear in full regalia and to speak the first words over the new circuit.

But the chiefs sent word they "chose not to make skookum-wa-wa (good talk) on white man's smoke signal."

Evidently the paleskins' talking invention is just that: too pale for the red men who prefer the older and more colorful, if slower and less certain, means of communication.

• • •

REACH PODNER! The frightened voice on the telephone told the sheriff of White Plains, N. Y. that a heavy-set man, wearing a sombrero, and with a .45-calibre revolver stuffed under his belt, had entered the County Trust Co. on Main St.

Five armed deputies rushed to the bank. The armed "stranger" was Frank M. Ward, assistant manager of the Westchester County Airport, who had come for the $3,000 weekly pay roll. Mr. Ward, who is licensed to carry a gun, is a Texan.

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April 24, 1948

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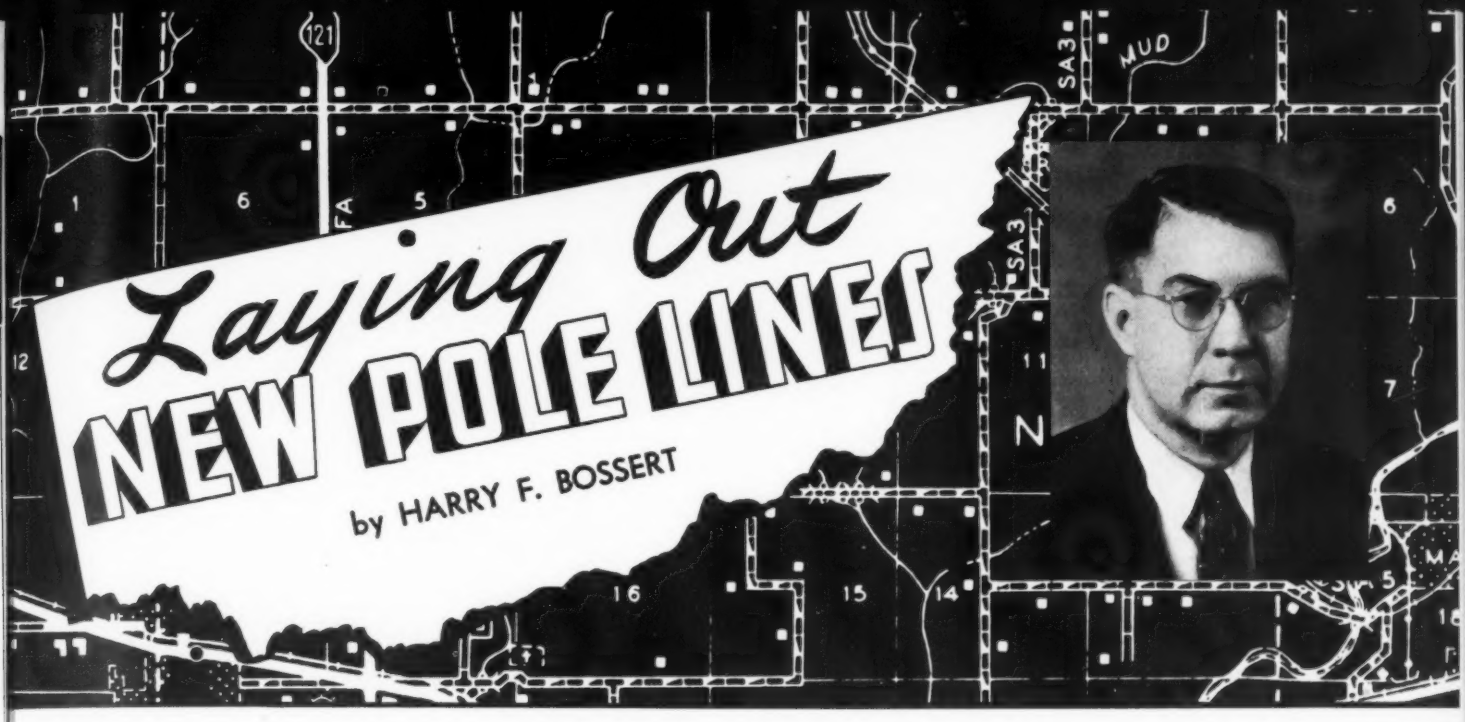


Laying Out NEW POLE LINES

by HARRY F. BOSSERT

IN PLANNING a new toll line installation, either pole line or buried cable, the plant superintendent is initially confronted with the problem of selecting the most practicable route from an economic and construction standpoint. Usually there are two or more possible routes between the given points which appear to have equal advantages (or disadvantages). The proper evaluation of these alternate routes is believed to be one of the most important phases in the planning of the new line, on which depends the economical use of construction funds, and the provision of a plant facility that will be well designed from a future maintenance and service standpoint.

Obviously, the first approach in selecting the route is from the standpoint of length, but seldom does the shortest possible route prove to be the most practicable. Other considerations involved are: Accessibility, type of right-of-way, i. e., private *vs* public; the location of power lines which may cause inductive interference; the location of other man-made structures such as buildings, bridges, railroads, highway structures, etc.; the amount of right-of-way clearing or rock-digging required; the location of streams and the suitability of available stream crossings, and the general nature of the terrain over which the line will be built.

Aside from first construction costs, the most direct route for a toll line is desirable, since it probably will provide a facility having the best transmission characteristics. Further, length of the route will have a decided effect on the overall cost of future attachments and expansion. Line maintenance costs also are directly proportional to length of line. The point is, of course, that when reconnaissance of the most direct route reveals obstacles or undesirable features opposing its selection, careful technical and comparative cost studies will be required in order to justify any deviation therefrom.

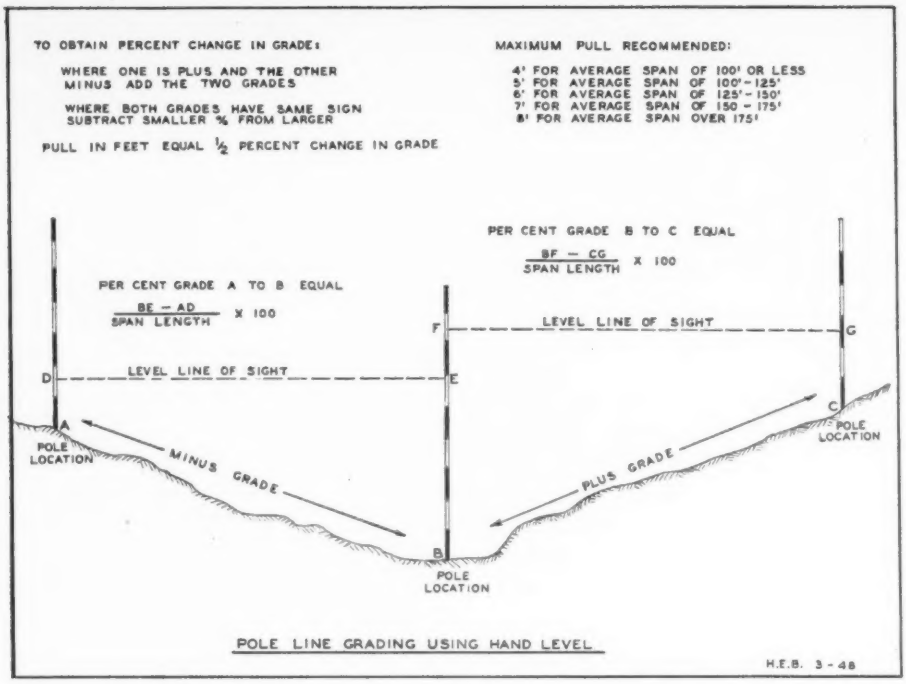
Accessibility of the route, both from a construction and maintenance standpoint, is an important consideration, but one that is not easy to evaluate in dollars and cents. The matter of accessibility is tied in closely with the problem of deciding whether to locate the new line on private or on public right-of-way. By public right-of-way, we mean that the toll line is located on the road or highway right-of-way. Such a location affords the most accessible route, and will, at the same time, present the least difficulty in the acquisition of easements from property owners. In the case of public right-of-way, the rights, releases or agreements required are those necessary for the location of anchors, stubs, overhangs, etc.

However, roads and highways do not always provide the most direct route, this being particularly true in the middle western states where the roads are usually layed out on the section lines and run East and West, North and South, rather than directly between points. Again, road locations usually will involve more difficulties in the way of buildings and other man-made structures, while serious opposition to the granting of tree-trimming rights will always be encountered in highly developed and congested areas.

Another objection to public right-of-way is that later improvement of the road such as widening, paving or realignment, may require costly line changes. Prior to the final selection of a route along the road right-of-way, the appropriate state, county or municipality highway authorities should be consulted and the extent of future road changes or improvements ascertained. In the event early highway construction is planned for the road along which a toll line is proposed, approved plans and maps should be obtained and used as the basis for detailed pole or underground installations. If highway construction is considered, but plans are indefinite, the road should be avoided as a possible toll line route.

In connection with the matter of highway improvement and public *vs* private right-of-way for telephone toll lines, the writer remembers the many line changes required during the 1920's when hard-surface road construction had reached an all-time peak. Many pole lines, built before the age of automobiles and the days of good roads, had to be moved in their entirety to make way for the widened road surfaces. These changes cost plenty of money and were certainly a headache to telephone men, trying to provide adequate guying, in cutting line wire in and out as the route length increased and decreased, and in maintaining suitable transposition spacing on open wire lines used for carrier circuits.

One of the larger companies, operating in a state which was coming out of the "mud," with its roads had had more than its share of these aggravating and costly line changes. Accordingly, when the time came to locate and build a new 200-mile pole line, it was decided that, in order to get away from any future line changes due to highway construction and also to avoid any existing and future small separation power line parallels, the new pole line should be located on private right-of-way.


TO OBTAIN PERCENT CHANGE IN GRADE:
WHERE ONE IS PLUS AND THE OTHER MINUS ADD THE TWO GRADES
WHERE BOTH GRADES HAVE SAME SIGN SUBTRACT SMALLER % FROM LARGER
PULL IN FEET EQUAL ½ PERCENT CHANGE IN GRADE
MAXIMUM PULL RECOMMENDED:
4' FOR AVERAGE SPAN OF 100' OR LESS
5' FOR AVERAGE SPAN OF 100'-125'
6' FOR AVERAGE SPAN OF 125'-150'
7' FOR AVERAGE SPAN OF 150-175'
8' FOR AVERAGE SPAN OVER 175'
PER CENT GRADE A TO B EQUAL
BE − AD / SPAN LENGTH X 100
PER CENT GRADE B TO C EQUAL
BF − CG / SPAN LENGTH X 100
LEVEL LINE OF SIGHT
LEVEL LINE OF SIGHT
D
E
F
G
A
B
C
POLE LOCATION
POLE LOCATION
POLE LOCATION
MINUS GRADE
PLUS GRADE
POLE LINE GRADING USING HAND LEVEL

H.E.B. 3-48

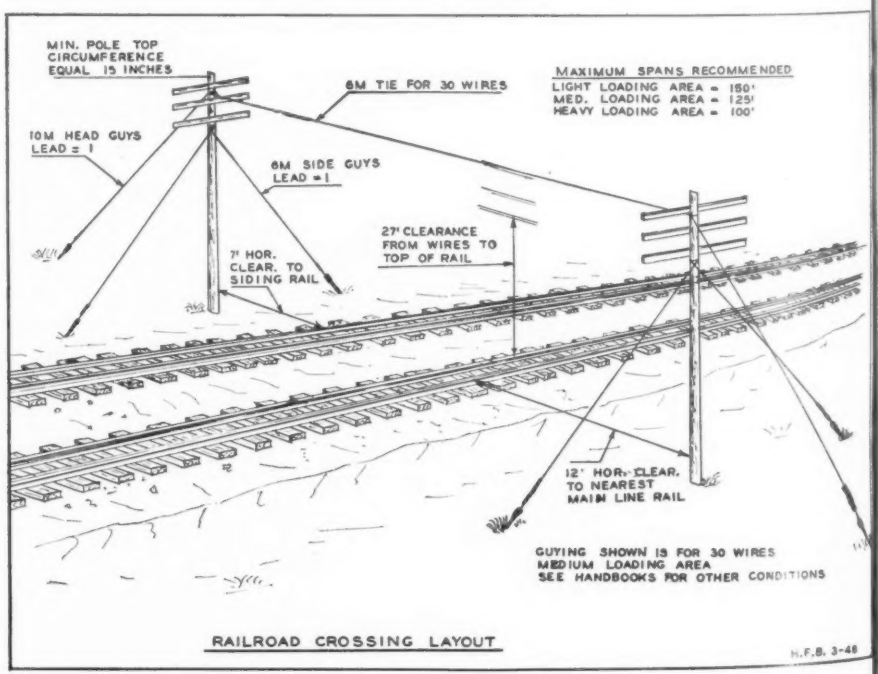
The route required was due east and west and could have followed the section line, on which there was usually a road, throughout the entire distance. Instead the line was located six feet to one side of the 20-acre line, or approximately 660 ft. from and paralleling the section line. The 20-acre line was usually a fence line and in some cases the property line. Right-of-way agreements were therefore not hard to obtain and were normally required from only one property owner because of the six-foot offset. For construction and maintenance purposes, however, the pole line was in a very inconvenient location and the writer has often thought about the "cussing" of the section linesmen as they opened and closed the many farm gates to gain access to the line.

Exposure to power lines should be avoided to the extent practicable. Where the route of the line must cross a power line, the intersection should be made as nearly at a right angle as possible. The line should not be located parallel to a power line unless the separation between the two lines will be at least 1,000 ft. Parallels for any appreciable distance and at smaller separations, may result in objectionable noise and dangerous voltages in the telephone circuits. There are cases, of course, usually resulting from the use of public right-of-way, when close parallels, such as lines on the opposite sides of the highway, cannot be avoided without unreasonable increases in length of line and cost of construction. In these instances coordination with the power company is indicated, for certain measures, such as the use of filters or transpositions in the power line, can be taken to reduce the induced interference.

Each power exposure introduces a separate problem. Rules and criteria which would apply in general to all cases cannot be stated successfully here. The point is that, during field reconnaissance of the proposed route, full data should be obtained on all power lines in the vicinity, from which detailed computations and studies can be made concerning the seriousness of any exposures that cannot be avoided. Data obtained regarding the power lines should include voltages, type and amount of power transmission; size and material of conductors; transpositions used, if any; types of insulators, crossarms, brackets, poles and towers used. Where crossings of high tension lines are proposed, clearances of power conductors from ground at point of cross-under, preferably close to a power pole, should be determined, and the presence of splices in the power conductors in the span involved should be noted. In all problems involving inductive interference, full coordination with the power company should be maintained.

The use of public right-of-way will probably result in more obstacles in the way of buildings, highway structures, ornamental trees, etc., than when routing the line over private right-of-way. These will usually involve no special or serious problems in line construction, but will cause increased costs of construction due to the probable requirements for extra height poles, additional corners and guys, and special fixtures. The policy should be to avoid congested areas as much as possible and to use routes following "back roads," all other considerations being equal. This especially applies to routes entering and leaving towns. In this connection, it is noted that when serving toll facilities to intermediate communities, the preferable method will be to build a spur from the toll line to the town, rather than deviate from the direct route, or from a route which has been selected to avoid congestion.

Several considerations are involved in regard to the effect of right-of-way clearing on the selection of the route. In many areas, timber has little relative value and no difficulties will be encountered in obtaining clearing or trimming rights. In these cases, the country is generally a timbered country and one route will have little advantage over another in the amount of clearing required. However, if public right-of-


MIN. POLE TOP CIRCUMFERENCE EQUAL 15 INCHES
8M TIE FOR 30 WIRES
MAXIMUM SPANS RECOMMENDED
LIGHT LOADING AREA = 150'
MED. LOADING AREA = 125'
HEAVY LOADING AREA = 100'
10M HEAD GUYS LEAD = 1
6M SIDE GUYS LEAD = 1
27' CLEARANCE FROM WIRES TO TOP OF RAIL
7' HOR. CLEAR. TO SIDING RAIL
12' HOR. CLEAR. TO NEAREST MAIN LINE RAIL
GUYING SHOWN IS FOR 30 WIRES MEDIUM LOADING AREA SEE HANDBOOKS FOR OTHER CONDITIONS
RAILROAD CROSSING LAYOUT

H.F.B. 3-48

way, without attendant timber clearing, is available in such areas, its selection may result in cheaper construction costs. It should be remembered that locations in timbered areas are a fire and wind hazard and that, in many instances, special precautions and methods of right-of-way clearing will be required. In other parts of the country, however, timber will have a correspondingly high value, either for ornamental, shade or marketable purposes. In these areas, clearing and trimming rights may be excessive in cost and difficult to obtain, in which case the amount of such clearing may have an important bearing on the selection of the route.

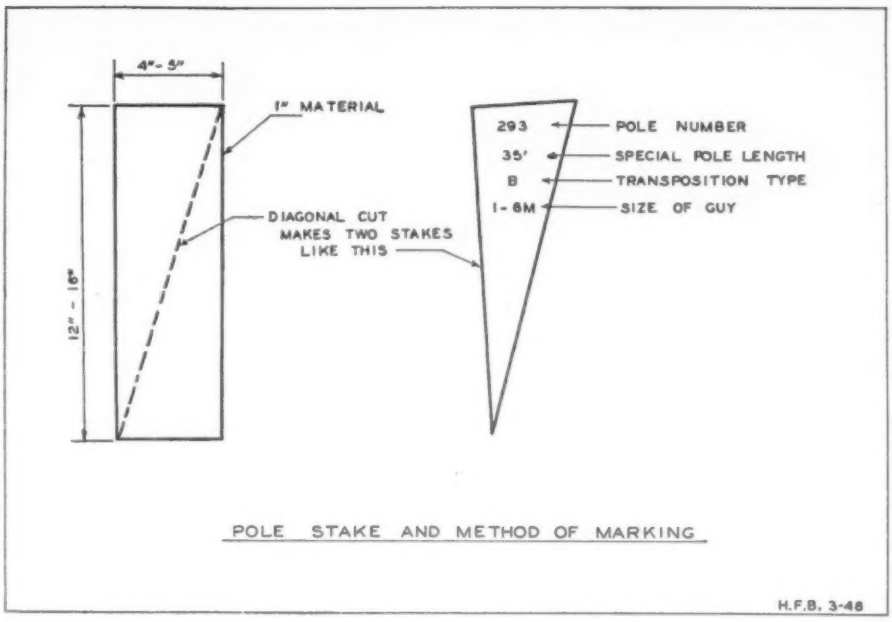
In these days of cable plows and earth boring equipment, accurate information is required concerning the amount of rock-digging on each of the possible line routes. By rock-digging, we mean any section in which pole holes or cable trench will have to be opened up by blasting and hand-shoveling methods. Several grades of rock may be involved, ranging from hard clay, through hard-pan or mixed clay and gravel, and shale, to solid rock. This type of construction will cost up to 10 times that of auger or plow construction and it does not take much rock-digging to affect adversely the selection of a particular route. Detour around a rocky, hilly area may be economically justified, but complete data and accurate cost studies are required to prove in the longer route.

In collecting field data concerning rock-digging, visual inspection is sometimes misleading, and use of a small hand earth auger, of the type used in collecting soil samples, is recommended. The writer remembers a pole line job in central Kansas where use of a tool of this type in surveying the route might have changed the route location and saved money in construction costs. Visual inspection of the route indicated no rock digging and it was assumed that an earth borer could be used throughout; rock was so scarce, in fact, that country school boys had trouble in finding small ones to throw at insulators.

Little trouble was encountered in using this method of construction on a long stretch of private right-of-way on the route selected. However, in a five-mile section near the end of the route, the pole line was located along a road which was bordered by large hedge-rows. The heavy growth of hedge had depleted the moisture content of the ground, causing the gumbo-like Kansas subsoil to be so hard and dry that the earth borer could not be used and the pole holes had to be drilled and blasted out. Five miles of this method of construction boosted construction costs considerably over the original estimate.

The availability of suitable crossings over major streams will sometimes control the route locations, and in the case of crossings on bridges, offer interesting problems in fixture design. In general, stream crossings present no unusual problems, but it is recommended that they be thoroughly inspected during reconnaissance in order to determine that a safe and adequate crossing can be built. For instance, in a projected bridge crossing, although attachments can be used, conditions at either end of the bridge might not allow safe and suitable approaches.

From the above remarks, it can be seen that a reconnaissance of all possible routes is required. It is recommended that accurate county road or property maps of the territory be obtained. Possible routes are then spotted on the map, and the maps then used to orient the field investigations. Actual survey of the routes can usually be accomplished by car. Mileages may be scaled from the maps taken from the car speedometer readings; these should be entered on the map. A complete set of notes should be kept, listing all the pertinent data affecting the various considerations



POLE STAKE AND METHOD OF MARKING

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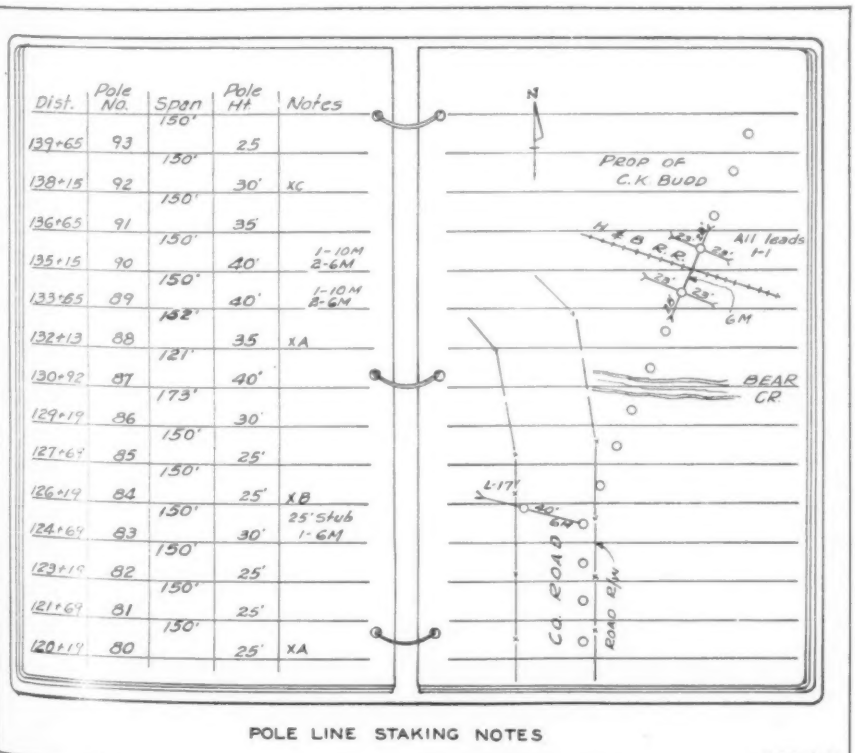


POLE LINE STAKING NOTES

H.F.B. 3-48

mentioned above. When complete data has been collected office studies can be made, a final route selected, and construction cost estimate prepared, all on an engineering basis, rather than on personal opinion or guesswork.

Staking the Line

Prior to the actual field staking of the new line, all design data, such as height of line, storm guying, pole spacing, cable loading, etc., will have been established. Staking of the line may then proceed as a separate and distinct operation from the actual construction. Considerable information, such as instructions and drawings, is available in various outside plant handbooks, covering the common methods and practices to be followed in the detailed staking of pole lines. Repetition here of this data does not appear necessary. However, the writer would like to set down some pertinent thoughts on the subject which might be helpful to telephone engineers engaged in new toll line construction.

As mentioned above, it is felt that the job of laying out the line should be carried out considerably in advance of the construction work. Also, the layout work should be coordinated with and subject to the acquisition of right-of-way agreements. If this plan is followed, costly construction delays may be prevented, and property damage held to a minimum.

It is strongly recommended that the services of a competent surveyor be obtained for laying out the new line. Usually, the county surveyor and his crew will be available, and with their experience at this type of work, the job can be completed much more expeditiously than when done by the telephone construction personnel who are, generally, not acquainted with surveying problems. As a result, although cost per day for the survey crew may run high, an actual reduction in the unit cost per mile for staking out the line may be effected. In addition, the more accurate computations and measurements made by the surveyor will result in better designed toll lines, as well as more reliable data and records.

Initial procedure recommended in staking the line will be to run the control survey, either for the entire line or for an extended section, depending on the overall length of the line, the availability of line locating personnel, and the planned construction schedule. Accurately marked stakes should be set at all control points, such as corners, stream crossings, terminal poles, line junctions, etc., and also as required for extending the line-of-sight for ease in the detailed staking to follow. These control points should be marked on the route maps mentioned above and a notebook should be kept, listing data obtained on the control survey which may be useful later in the detailed layout of the line.

Since the detailed staking may not be done by the same party making the control survey, it is essential that the notes describe the location of any control stakes set, so that they may be easily found when required by the staking party. No attempt should be made to set any pole stakes while making the control survey. After the control line is firmly established, detailed staking of the line may then proceed without the necessity of re-runs, changes, etc.

In the past many long pole lines have been staked out using the familiar red-and-white range rods, or even eight-foot shovel handles, to carry forward the line of sight and a surveyor's chain to mark off the spans. Most telephone linemen are familiar with this method and it is described in various outside plant handbooks. It is a slow and not very efficient process, likely to result in many re-runs, poor alignment, and excessive number of corners and inaccuracies in span lengths. Staking of new lines by this method is not recommended.

Better engineering practice is to form a locating party, equipped with a surveyor's transit, a 200-ft. steel tape, a 50-ft. cloth tape, transit rods or range poles, chaining pins and associated equipment, to accomplish the layout by routine surveying methods. The locating party should be composed of a chief of party, a transitman (the surveyor), two chainmen, a stakeman, who will carry and drive the stakes, and a car or truck driver, who also will act in the capacity of rodman when required. Over timbered right-of-way, brush cutters, to assist in clearing a line of sight, also may be required.

The chief of party may or may not also act as the transit man; in either event it is important that he have a thorough understanding of grading, guying, clearances and other general requirements covering toll line design. He also should be equipped to take notes during the detailed staking work, maintaining a notebook in which should be listed data indicating cumulative length of line, span lengths, pole heights, transposition and guy locations, stream and railroad crossings, line junctions and terminal poles, railroad freight sidings and access points, property owners' names and addresses, and other pertinent information. This data, if kept carefully, will make it possible to clear up any questions that may arise during construction, and also will serve as the basis for the permanent line record.

Since they will be better equipped to do this work, the line locating crew should stake the line out in complete detail, so that the construction gang will not have to do any measuring or computing to install anchors, stubs, H-fixtures and other required plant. In the case of pole lines, a stake should be driven in the ground at each pole location, including H-fixtures and stubs, and at every anchor location. Each stake should be carefully marked with surveyor's crayon to indicate all necessary information required by the construction gang, such as pole number, pole length, if different from normal because of grading, size and type of anchor and size of guy strand. On anchor stakes it also is desirable to show the lead required in case the stake is accidentally knocked out. In the case of buried cables, in addition to line stakes as required, splice and loading points should be staked, and it may be advisable to set a line stake at each property line for right-of-way purposes. It is recommended that line stakes on buried cable routes be set at 200-ft. intervals. A uniform type of stake should be used throughout for line layout. The writer has found that a suitable stake can be cut from 1 in. x 5 in. lumber. First cut it into lengths of 12 to 16 ins., depending on the route features. The pieces are then cut diagonally to make two sharpened stakes having a flat surface of sufficient size on which mark all data.

Carelessness in attention to details while laying out the line may result in errors that will cause difficulties and additional costs during construction, as well as deteriorate the efficiency of the completed plant. In staking out pole lines, one aggravating error that can happen is to duplicate a pole number on a stake, or to leave out a number. For instance, two consecutive stakes will be marked say "293;" or the next stake after "292" may be erroneously marked "294." In the first instance, the line would actually be one span longer than recorded, while in the second instance, the line would actually be one span shorter. Usually this error is caught during construction or sooner, but if it isn't, the transposition scheme may be affected adversely. In any event, adjustments are required in the numbering scheme, as soon as the error is caught.

Errors in length in cable lines are sometimes more serious. Measurements must start from the cable vault or from a loading pot already in place if the new line is to be tied into an existing cable and loading system. Stakes

(Please turn to page 41)

CABLE SPLICING

By DANIEL SEITZ
Cable Superintendent
York (Pa.) Telephone & Telegraph Co.

EDITOR'S NOTE: *In this installment, the author gives some useful information on cable conductor sizes that can be used to advantage in the planning of any cable system. The use of grade clamps to prevent bowing is explained. Methods for sealing of the cable-end and setting up for an aerial cable splice are also interpreted.*

* * *

BECAUSE copper has many desirable characteristics, it is used exclusively for telephone cable conductors. Ductility, low resistance and long life are some of its good qualities. Being ductile, it can be drawn to very accurate and uniform sizes. Its low resistance to the flow of electric current makes it ideal as a conductor and when enclosed in a lead sheath to protect it from the elements and chemical action, its life is practically unlimited.

The following table indicates the conductor gauge and the purpose for which each size is most commonly used:

No.	*Gauge*	*No. of pairs in cable*	*Used for*
26	AWG	11 to 2,121	Short subscriber circuits.
24	AWG	11 to 1,515	Medium length subscriber circuits
22	AWG	11 to 909	Long subscriber and sometimes short toll circuits.
19	AWG	6 to 404	Long subscriber and toll circuits.
16	AWG	According to spec.	Toll circuits.
13	AWG	According to spec.	Toll circuits.

Telephone cable wire gauge comparisons follow:

Gauge	*Dia. in milliammeters*	*Dia. in inches*					
	B&S	*AWG*	*B&S*	*BWG*	*W&M*	*OEG*	*NBS*
26	.4039	.016	.0159	.018	.018	.0205	.018
24	.5105	.020	.0201	.022	.023	.025	.022
22	.6434	.025	.0254	.028	.028	.0295	.028
19	.9115	.035	.0359	.042	.041	.040	.040
16	1.29	.050	.0508	.065	.063	.065	.064
13	1.83	.072	.0720	.095	.092	.095	.092

AWG (American Wire Gauge)
B&S (Brown & Sharp Gauge)
BWG (Birmingham Wire Gauge)
W&M (Washburn & Moen Gauge)
OEG (Old English Gauge)
NBS (New British Standard Gauge)

Some of these gauges are seldom used nowadays, but are listed for comparison and identification purposes.

PART III. The second article in this series appeared in the July 5, 1947 issue, page 14.

Resistance of pure copper wire used in telephone cable is as follows:

B&S Gauge	*Ft. per ohm at 75° F.*
No. 26	24.469
No. 24	38.918
No. 22	61.911
No. 19	123.99
No. 16	248.81
No. 13	498.83

Immediately upon the completion of the aerial cable pulling-in operation by the construction forces, the overlaps of cable at the splices should be made secure against longitudinal movement of the cable as shown in *Fig. 1A*.

Lashed cable may be held in place by the application of two layers of friction tape. The following methods may be used when cable is placed in rings. A short length of bonding wire or ribbon attached to cables by soldering, as shown by *Fig. 1B*, will prevent creeping due to expansion and contraction of the cable until such time as the splicing forces complete a permanent splice. The snubbing of the cable is very important if there is any time lapse between the placing and splicing operation. This is especially true if there is considerable fluctuation of the temperature in the meantime.

Many cases of aerial cable bowing are the direct result of allowing lengths of unspliced cable to remain in the rings for a considerable length of time with the ends free. During the period of low temperature when contraction takes place, the cable is pulled away from the overlap in a straight line if it has not been snubbed in some manner. Then, when the temperature again rises and expansion takes place, it is often easier for the cable to move sidewise in the rings than to move longitudinally to its former position. This snubbing of the cable is equally important at cable ends, aerial turns, corners or angles in the line. Regardless of whether the pull is toward the pole or away from it, the cable must always be held in place in order to prevent longitudinal movement. *Fig. 2* shows methods of accomplishing this holding action at such points.

Numerous types of grade clamps are available, many of which will do a good job if properly attached and maintained. A grade clamp to be effective and not cause sheath breaks must allow the cable to swing, roll and vibrate a normal amount without injury to the sheath. Bonding ribbon, 18 inches long, soldered to the sheath and clamped to the strand (see *Fig. 2A*), will accomplish all these functions. This method will, moreover, provide a good bond between strand and cable.

It must be borne in mind, however, that ordinary clamps should not be used to bond cable sheath and strand

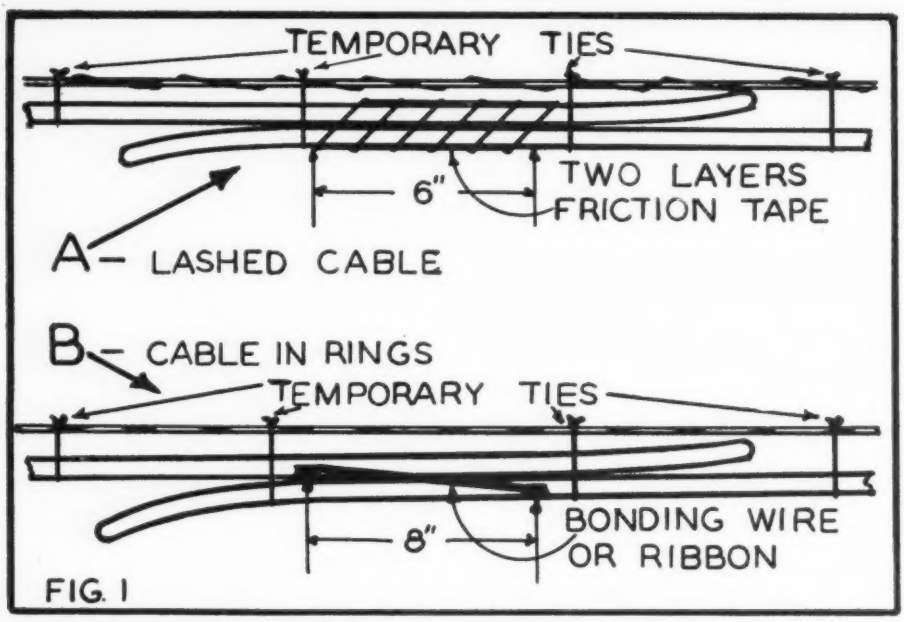


Fig. 1. Showing method of holding cable until permanent splice can be made.

UPPER PHOTO: First splicing operation. Ring the cable to provide the desired opening.

LOWER PHOTO: Second splicing operation. Remove sheath.

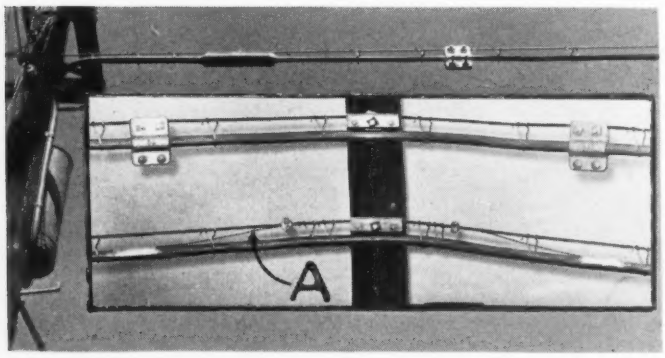


Fig. 2. Method of holding aerial cable in place at ends and at angles in the line.

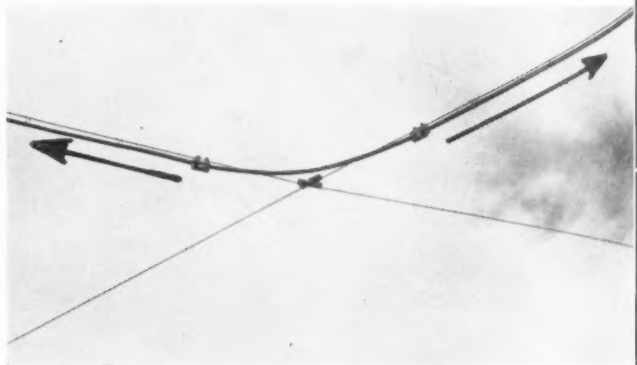


Fig. 3. Method of using grade clamps at aerial turns to prevent cable moving in direction of arrows.

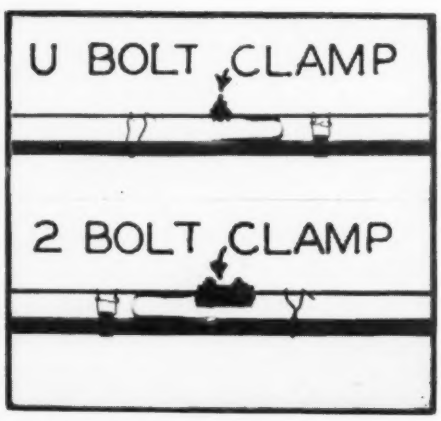


Fig. 4. Method of bonding cable to strand when rings are used.

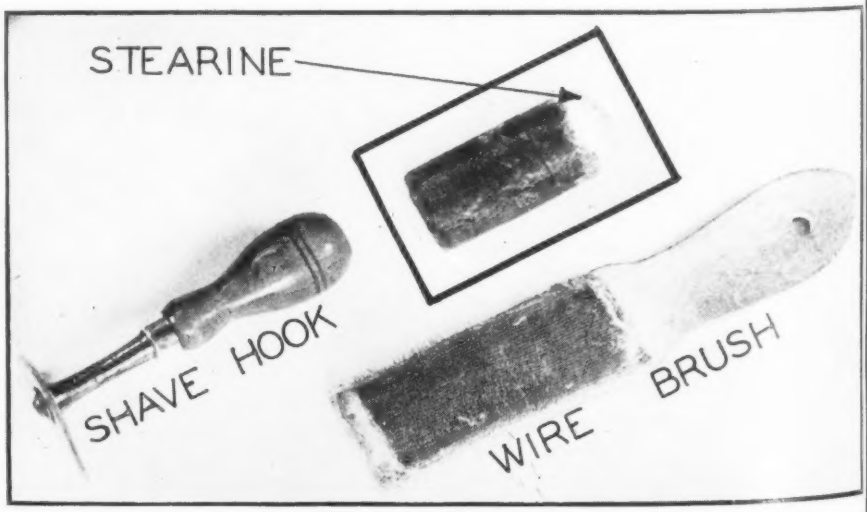


Fig. 5. Tools used for cleaning cable sheath and container for sterine flux.

because of the possibility of high resistance contacts developing between the metal clamps and the sheath. In order to prevent this, solder 16 oz. copper ribbon or flexible wire to the sheath and clamp firmly to the strand with a one or two-bolt clamp as indicated in *Fig. 4*.

Place bonds at 1,000 ft. intervals along the entire cable and at all ends. Lashed cable does not require the same treatment as cable in rings. This problem will be discussed later.

When cable must be cut at splices, the ends may be protected against moisture for 24 hours or less by several layers of friction tape. It is, however, far safer to seal the ends by soldering, and if there is a possibility of the cable not being spliced for a considerable time, do not even consider the use of tape. To seal the end of a cable, bend it so that it is in an upright position as illustrated in *Fig. 6*. Drive the wires back into the sheath about one-fourth inch with a steel drift pin. A piece of metal approximately five-eighths by three inches will do the job (see *Fig. 6C*). Clean about two inches of the lead sheath back from the end, using a shave hook on old sheathing, a wire brush *(Fig. 5)*, or steel wool on new sheathing. Next coat it well with stearine. Form a tube from ordinary paster paper, close one end and fill with melted stearine. When it has cooled, remove about one-fourth inch of paper from one end to expose some of the stearine (see *Fig. 5*). This procedure keeps the stearine clean and convenient to use. Now beat the sheath in with a hammer until the end of the cable is flat, then solder by one of the suggested methods (see *Fig. 6B*). With a soldering iron, drip 50-50 solder into the opening until filled, then flow the solder over the lead until the sheath is thoroughly tinned. Then add enough solder to make certain of a good job. This may also be accomplished by using an acetylene torch and stearine core solder *(Fig. 6A)*, following the same procedure as when using a soldering iron. An ordinary blow torch may also be used for this soldering operation.

After the splicer's platform has been hung for aerial splicing, place a strand jack, as shown in *Fig. 7*. This jack will provide adequate space between the splice and strand for convenient working. Then, also, when the jack is removed, there will be no slack in the cable adjacent to the splice.

The following tables indicate correct opening and sleeve dimensions which will be found useful for planning a splice. These figures may be varied to suit individual cases according to the splicer's good judgment:

22 Gauge Aerial Straight Splices

Cable Pairs	*Opening*	*Sleeve*	*Rows (tubes)*
11	9″	1″ x12″	2
16	9″	1¼″x12″	2
26	9″	1¼″x12″	2
51	9″	2″ x12″	2
101	12″	2″ x15″	3
202	12″	3″ x15″	3
303	16″	3½″x20″	4

19 Gauge Aerial Straight Splices

Cable Pairs	*Opening*	*Sleeve*	*Rows (tubes)*
11	9″	1¼″x12″	2
16	9″	1½″x12″	2
26	9″	1½″x12″	2
51	12″	2″ x15″	3
101	12″	2½″x15″	3
202	16″	3″ x20″	4
303	16″	4″ x20″	4

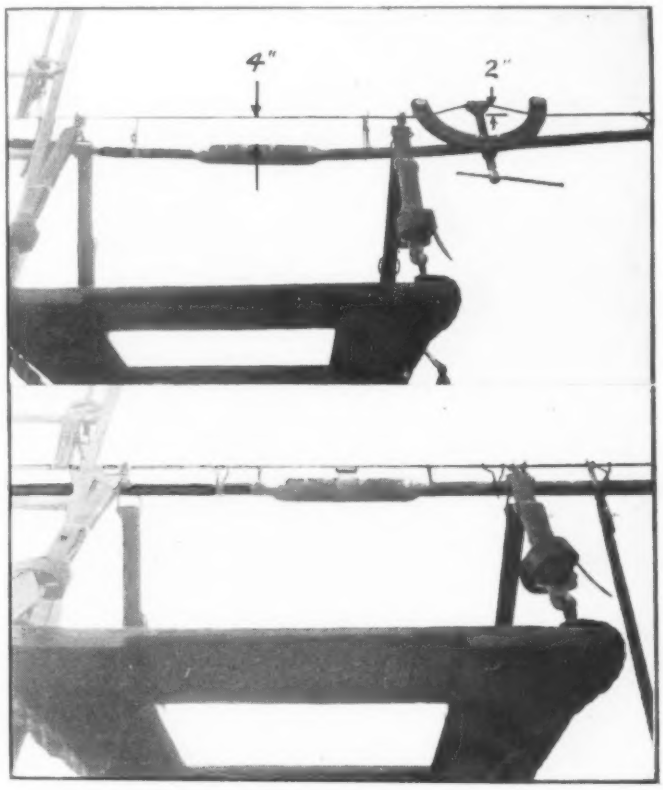


Fig. 7. Top view shows use of jack to lower cable for splicing. In bottom view jack is removed and the completed splice is permanently in place.

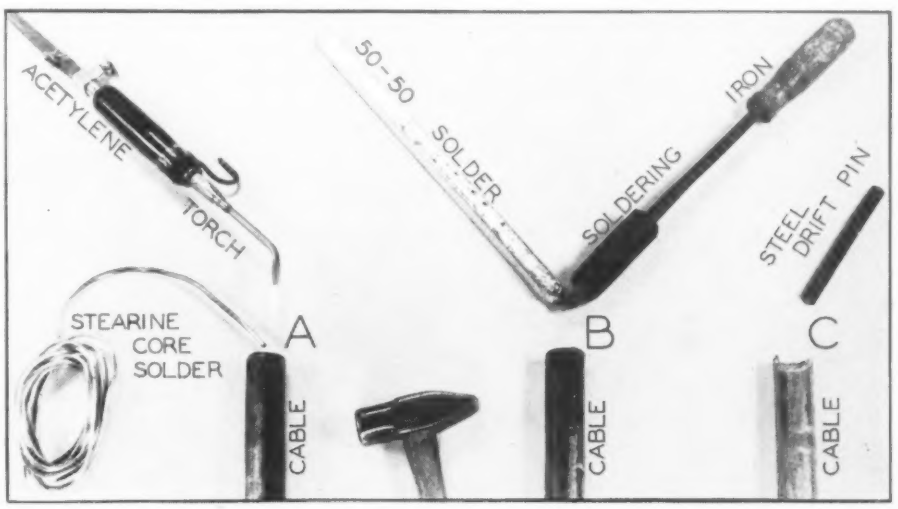


Fig. 6. Methods of preparing and sealing cable ends.

22 Gauge Aerial Branch Splices (When cable is cut)

Main Cable Pairs	Branch Cable Pairs	Opening	Sleeve	Rows (tubes)
11	11	9″	1½″x12″	2
16	11	9″	2″ x12″	2
16	16	9″	2″ x12″	2
26	11	9″	2″ x12″	2
26	16	9″	2″ x12″	2
26	26	9″	2″ x12″	2
51	11	9″	2″ x12″	2
51	16	9″	2″ x12″	2
51	26	9″	2″ x12″	2
51	51	12″	2″ x15″	3
101	11	12″	2″ x15″	3
101	16	12″	2″ x15″	3
101	26	12″	2″ x15″	3
101	51	12″	2½″x15″	3
101	101	12″	2½″x15″	3
202	11	12″	2½″x15″	3
202	16	12″	2½″x15″	3
202	26	12″	2½″x15″	3
202	51	12″	3″ x15″	3
202	101	12″	3″ x15″	3
202	202	16″	3½″x20″	4
303	11	16″	3½″x20″	4
303	16	16″	3½″x20″	4
303	26	16″	3½″x20″	4
303	51	16″	3½″x20″	4
303	101	16″	4″ x20″	4
303	202	16″	4″ x20″	4
303	303	16″	4½″x20″	4

19 Gauge Aerial Branch Splices (When cable is cut)

Main Cable Pairs	Branch Cable Pairs	Opening	Sleeve	Rows (tubes)
11	11	9″	1½″x12″	2
16	11	9″	1½″x12″	2
16	16	9″	2″ x12″	2
26	11	9″	2″ x12″	2
26	16	9″	2″ x12″	2
26	26	9″	2″ x12″	2
51	11	9″	2″ x12″	2
51	16	9″	2″ x12″	2
51	26	9″	2″ x12″	2
51	51	12″	2½″x15″	3
101	11	12″	2½″x15″	3
101	16	12″	2½″x15″	3
101	26	12″	2½″x15″	3
101	51	12″	2½″x15″	3
101	101	12″	3″ x15″	3
202	11	12″	3″ x15″	3
202	16	12″	3″ x15″	3
202	26	12″	3″ x15″	3
202	51	12″	3″ x15″	3
202	101	16″	3½″x20″	4
202	202	16″	4″ x20″	4
303	11	16″	4″ x20″	4
303	16	16″	4″ x20″	4
303	26	16″	4″ x20″	4
303	51	16″	4″ x20″	4
303	101	16″	4½″x20″	4
303	202	16″	4½″x20″	4
303	303	16″	5″ x20″	4

22 Gauge Aerial Branch Splices (When cable is not cut)

Main Cable Pairs	Branch Cable Pairs	Opening	Sleeve	Rows (tubes)
11	11	12″	1½″x15″	2
16	11	12″	1½″x15″	2
16	16	12″	1½″x15″	2
26	11	12″	2″ x15″	2
26	16	12″	2″ x15″	2
26	26	12″	2″ x15″	2
51	11	12″	2″ x15″	2
51	16	12″	2″ x15″	2
51	26	12″	2″ x15″	2
51	51	12″	2½″x15″	2
101	11	12″	2½″x15″	2
101	16	12″	2½″x15″	2
101	26	12″	2½″x15″	2
101	51	12″	3″ x15″	2
101	101	12″	3″ x15″	2
202	11	12″	3″ x15″	2
202	16	12″	3″ x15″	2
202	26	12″	3″ x15″	2
202	51	12″	3½″x15″	2
202	101	16″	3½″x20″	3
202	202	16″	4″ x20″	3
303	11	16″	3½″x20″	4
303	16	16″	3½″x20″	4
303	26	16″	3½″x20″	4
303	51	16″	4″ x20″	4
303	101	16″	4″ x20″	4
303	202	16″	4½″x20″	4
303	303	16″	5″ x20″	4

19 Gauge Aerial Branch Splices (When cable is not cut)

Main Cable Pairs	Branch Cable Pairs	Opening	Sleeve	Rows (tubes)
11	11	12″	1½″x15″	2
16	11	12″	1½″x15″	2
16	16	12″	2″ x15″	2
26	11	12″	2″ x15″	2
26	16	12″	2″ x15″	2
26	26	12″	2″ x15″	2
51	11	12″	2″ x15″	2
51	16	12″	2″ x15″	2
51	26	12″	2½″x15″	2
51	51	12″	2½″x15″	2
101	11	12″	2½″x15″	2
101	16	12″	2½″x15″	2
101	26	12″	2½″x15″	2
101	51	12″	3″ x15″	2
101	101	16″	3″ x20″	4
202	11	12″	3″ x15″	2
202	16	12″	3″ x15″	2
202	26	12″	3½″x15″	2
202	51	16″	3½″x20″	4
202	101	16″	4″ x20″	4
202	202	16″	4½″x20″	4
303	11	12″	3½″x15″	2
303	16	12″	3½″x15″	2
303	26	12″	4″ x15″	2
303	51	16″	4″ x20″	4
303	101	16″	4½″x20″	4

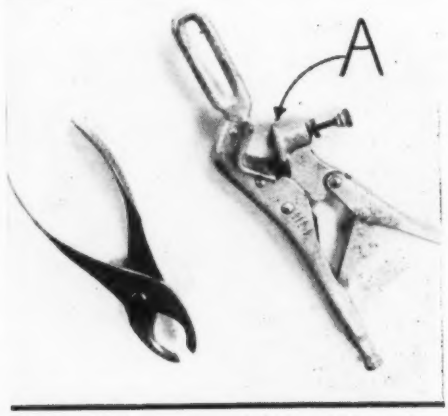


Fig. 8. Tools recommended for ringing cable.

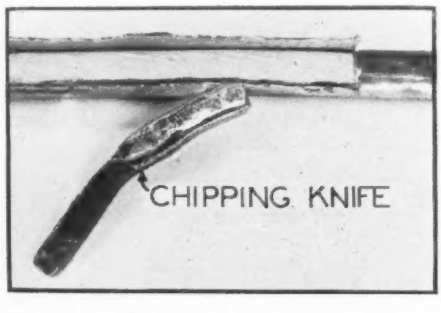


Fig. 9. Methods of using chipping knife for removing sheath from cables 1½ ins. in diameter and larger.

Sequence of splicing operations: First, ring the cable with the tool most suitable for the size cable being spliced. *Fig. 8* shows two such tools suitable for use on cables up to 1½ ins. in diameter. The plier type must be used with caution so as not to cut into the paper insulation. It is, however, very satisfactory for small cables. The tool *(Fig. 8A)*, may be set to cut any desired depth and should be set slightly less than the sheath thickness. For cables 1½ ins. in diameter and larger use a chipping knife *(Fig. 9)*. Hold the knife at an angle as shown so as

(Please turn to page 62)

MOTOR VEHICLES IN THE TELEPHONE INDUSTRY

by **RAY BLAIN**

MOTOR transportation is an important adjunct to the providing of good telephone service in this modern age. In the old horse and buggy days, the covering of rural and toll lines over muddy country roads to clear trouble was, at best, always a slow and difficult task. However, present-day motor vehicles and all-weather roads in most sections of the country make the clearing of trouble a simple chore, as compared to that of yesterday. Because of this modern means of transportation, a reduction in the length of service interruptions has resulted which, in turn, has contributed much towards the betterment of telephone service in general.

The old-time construction crew usually piled everything onto a slow moving wagon and wasted considerable time each day getting to and from the line job. Now, a modern line construction truck equipped with a winch and pole derrick permits a crew of four or five men to do more work in a day than was formerly possible for a crew three times this size. Many of these trucks are of the five-man heated cab type so that the workers may ride in comfort to and from the job regardless of weather conditions. These cabs also provide a comfortable place for the workers to eat their lunch out on the job.

The modern truck, equipped with an earth boring machine for boring pole holes, is a real labor saver and one that actually pays dividends on every large construction job where soil conditions permit its use. On jobs where the terrain and earth conditions are favorable, it is possible to bore holes and drop poles into them at the rate of one every five minutes.

The smaller types of power operated earth drills also prove advantageous for use by the small and medium-sized telephone companies in their construction work. Often, these drills are mounted on trucks or Jeeps and prove a boon to the smaller companies.

Trailers, for use with line construction and maintenance trucks, also prove a true labor and time saver. The pole hauling trailer, the cable reel trailer, and the cable splicing trailer all make the construction job easier, cheaper and safer to accomplish.

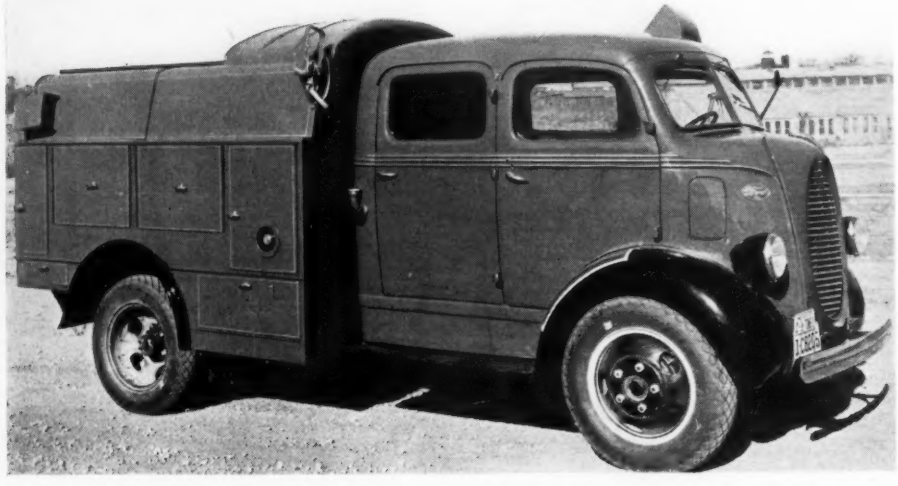
The light installation, or trouble truck, with compartments designed to hold all tools and materials and make them quickly available when required on the job, is a "must" in the efficiently managed telephone exchange of today. The overhead ladder rack on this type of truck is gradually replacing the old side mounted ladder formerly used extensively.

The aerial ladder type truck, the latest construction vehicle adopted by the telephone industry, is proving extremely useful and popular. This conveyance greatly simplified the job of maintaining and splicing aerial cable. Where tree interference is not serious, a man can perch on this ladder and inspect cable as the truck is driven along the line.

The various truck body suppliers are doing a marvelous job at the present time in meeting the demands of the telephone industry. Even during the recent war, a great number of telephone orders were filled without unusual delay, despite war shortages and heavy demands of the armed services. Since we have not heard any complaints of late, it is apparent that all truck body orders are being filled promptly. We urgently recommend to anyone who may require a construction or maintenance truck body that he consult one of the suppliers. This will, in practically every case, prove more economical and satisfactory than an attempt at local fabrication.

While the above rule is suggested for present and future action, we do have

Standard line construction body mounted on a two-chassis, manufactured by American Coach & Body Co.



Five-man-cab construction truck. Body manufactured by Highway Trailer Co.

Line construction and general maintenance truck. Extra cab accommodates four passengers. Body manufactured by McCabe Powers Auto Body Co.

information on two cases where truck bodies were constructed locally when the necessary equipment could not be procured from a supplier. We believe that these merit mention in this article. They are examples of the resourcefulness of practical Independent telephone men and again prove that they always come through in a pinch.

Robert DeVore, of the Southern Nevada Telephone Co., Henderson, Nev., had a need for a good, serviceable body to carry cable tools and materials and he constructed one to meet the need.

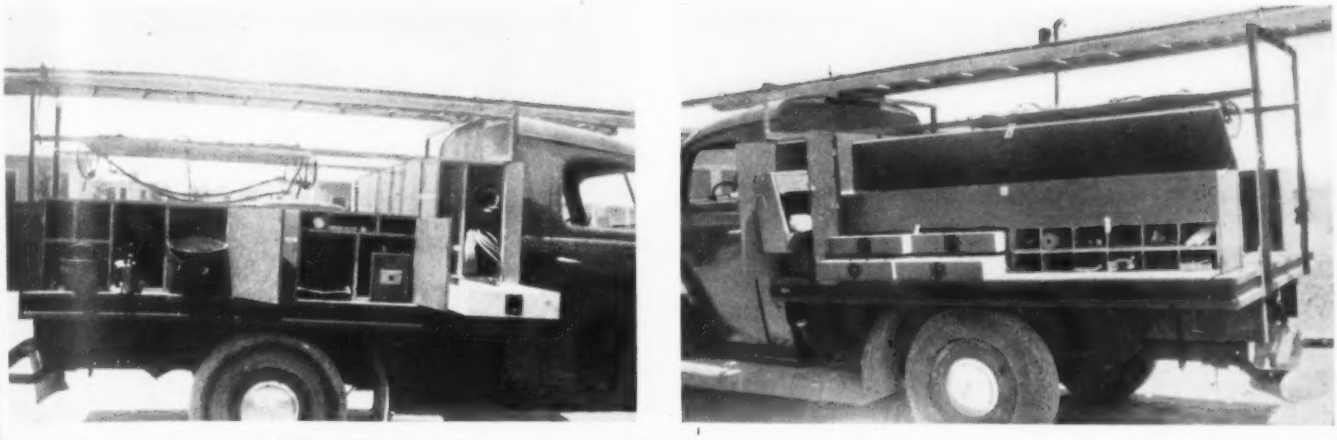
This body was designed for and mounted on a 1½-ton truck which gives ample carrying capacity for an occasional reel of cable, additional terminals and enough power, if needed, for pulling a trailer. As will be noted from the accompanying photographs, the boxes do not extend to the side edges of the car body, thus eliminating damage by possible collision with side swiping vehicles.

On the left-hand side, the forward compartment houses the splicer's tool boxes which sit on a shelf. Under this is a long, heavy drawer the full width of the body which is available to either side. This drawer has four compartments and is intended to contain heavier tools such as hammers, drills, solder, tow chain, etc. On the right-hand side, the upper section of the main compartment has hooks for belts and climbers, handline and hoist. Also, on this side, the main body is divided into sections, built to fit the tools carried, as may be seen from the open view. Testing equipment is grouped together at one end and heating tools at the other. The sections under the paraffin kettle and the solder pot are covered with a light steel and asbestos base.

On the left-hand side, the four forward drawers are divided into small compartments for such items as nails, screws, lags and other necessary small items. Toward the rear of the body, larger openings contain muslin, lacing twine, candles, cable straps, grade clamps, etc. The lid of this full length box opens to two compartments, one of which will hold two terminals and the other, various sizes and lengths of lead sleeving.

Just above these boxes is an angle iron rack into which the platform slides on rollers mounted on the rear. The rollers also provide a stop to prevent the platform from sliding off.

The front of the ladder rack just clears the top of the cab and the supports on which the ladder rests directly are protected with sections of heavy fire hose. Suitable spring clamps are provided to prevent loss or damage to the ladder while it is being carried.



The truck body designed by ROBERT DEVORE showing large compartments used for cable splicing tools (left); and small compartments on the other side of the truck (right).

This particular body is made of one-half inch and five-eighths inch plywood finished with an undercoat of linseed oil and two coats of paint. Although this makes a practically permanent body for dry climates, in some parts of the country, however, it may be necessary to build this of sheet steel because of extreme weather conditions.

Ample space is provided on the truck bed between the tool bodies for a reel of cable, extra material, etc.

William E. Thompson, of the Carlisle (Ind.) Telephone Co., was faced with the problem of manpower shortage and higher operating cost so he looked around for some labor saving device which would reduce construction expense.

At a cost of $90, he added some equipment to a one-half-ton truck which will set any pole less than 40 ft. in length and will pick up a weight of one ton on a straight line, and a greater load by adding an extra pulley and using a double line.

The tripod boom is constructed of pipe. The winch is a two-speed hand operated type which was purchased from an army surplus center. The platform on which the winch is mounted is also used to mount two wire stringing reels when the winch is removed. Two adjustable outrigger jacks, mounted below the reel platform, are used to remove all weight and strain from the truck when the winch is in use.

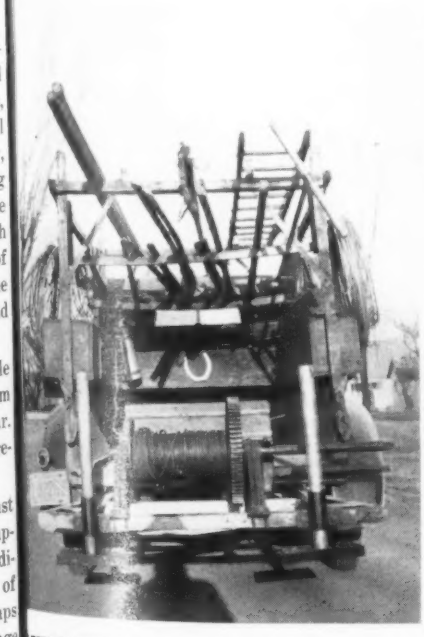
Two men can assemble the derrick and winch in less than 30 minutes. One man can, with the help of this arrangement, set a 35 or 40 ft. pole, which would require at least six or seven men if the job were performed manually.

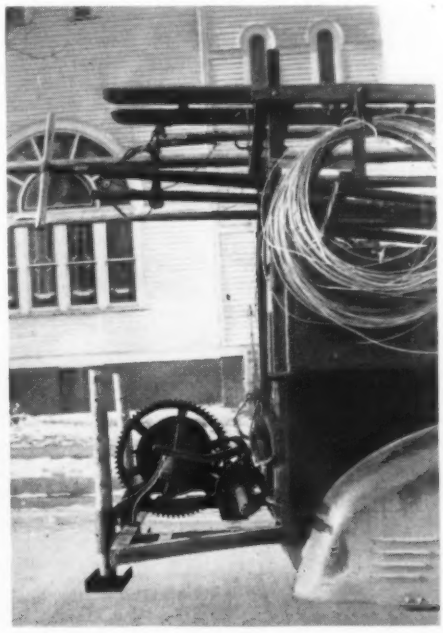
This rig also has been used to advantage for loading heavy poles on trailers and stacking poles in the yard. Moreover, it is used to support heavy tree limbs and prevent them from falling on lines when the limb is cut from the tree.

The men of the Carlisle Telephone Co. cut, drilled and fitted all of the parts used in the construction of this outfit. The aid of a welder was enlisted in their assembly.

We believe these two examples show the ingenuity of Independent telephone men. It also proves conclusively that labor saving truck equipment is an urgent requirement in the modern telephone exchange.

It is again suggested that if your company has a need for such equipment, it investigate the product of the various truck body suppliers.





LEFT PHOTO: Pole setting truck built by W. E. THOMPSON of the Carlisle (Ind.) Telephone Co. CENTER PHOTO: Close-up of winch arrangement. RIGHT PHOTO: Pole being lifted by truck.

IN THE NATION'S CAPITAL

BY
FRANCIS X. WELCH
WASHINGTON
EDITOR

FCC decision favors RCAC in case involving communications between U. S. and Hawaiian Islands. . . . NLRB rules agencies are independent contractors and that affiliated companies may be included in same unit for purposes of collective bargaining.

WHETHER a telephone company or a radio carrier should handle trans-oceanic toll connections is an issue which has caused the latest policy split in the Federal Communications Commission. Four of the seven members took the position that Radio Corp. of America Communications, Inc. should be permitted to handle trans-Pacific circuits which connect the Bell System in the United States with the Independent system rendering telephone service in the Hawaiian Islands. In effect, the majority of the FCC denied the application of Mutual Telephone Co. of Honolulu to construct its own point-to-point radio service for direct connection with the AT&T facilities in the United States.

Commissioner Walker, joined by Chairman Coy (his first major dissenting opinion), took a contrary position—that the telephone using public has a right to expect a continuous over-all responsibility in the handling of such trans-oceanic long distance calls through the service of regulated telephone companies. Their point of view was that the intervention of RCAC—in the handling of the long distance circuits between the two separate land wire telephone systems—amounted to a division of service responsibility which was not in the interest of the telephone using public.

The majority of the FCC ruled that RCAC, as an established world-wide operator of radio communications circuits, had proved its ability to handle such traffic, whereas the Mutual Telephone Co. was, as yet, an unproved operator of radio circuits and at best could only be expected to perform as well as RCAC already is performing. Commissioner Jones concurred with the result reached by the majority of the FCC but did not disclose his reasons. Although there was no early information as to whether Mutual Telephone Co. plans to appeal, it is to be hoped that the courts will have an opportunity to pass on this important policy decision.

It is of importance to the telephone industry as a whole because it goes back to the fundamental principle of whether the service responsibility of a public utility can properly be delegated to an non-utility in any part or subordinated phase of service operation. Commissioner Walker's dissenting opinion made this point very well when he said in part:

"Mutual is a locally owned company and, as such, is concerned only with the rendition of adequate and efficient communications service by wire and radio to the Hawaiian public. On the other hand, RCAC is a wholly owned company concerned with the rendition of communications service by radio between the United States and many foreign countries. As between the two companies, Mutual is the company that can be expected to devote itself to developing the radio-telephone service in such manner as will best serve the interests and needs of the Hawaiian public, without distraction by the requirements of interests elsewhere."

The record showed that Mutual's proposed station would be located on a more protected part of the island of Oahu than the present RCAC communications station and would be connected with the terminal equipment cable (as compared with the open wire lines used by RCAC), thereby eliminating possible danger from salt spray and falling branches. Commissioner Walker's dissenting opinion continued:

". . . It appears to me that the problems involved in the tran-oceanic communications are not materially different from problems involved in the operation of some of the inter-island circuits; and that Mutual personnel has had the necessary experience in operating over sufficiently long distances to enable such personnel to handle satisfactorily the problems involved in trans-oceanic communications.

"I believe that Mutual, as the local telephone company, has an inherent right to operate the service without the intervention of a third party, that if Mutual's application were granted it would provide at least as good and possibly a better service than is now provided by the joint Mutual-RCAC operation. (Italics supplied.)

"I believe that the majority opinion herein gives an unduly restrictive interpretation to the statutory standard of public interest, convenience, or necessity; that since Mutual can render at least as good a service as RCAC the considerations discussed above should be controlling in Mutual's favor. This is especially so in view of the provisions of Section 307(d) of the Communications Act which provides that the action of the commission with reference to the granting of an application for renewal of a license "shall be limited to and governed by the same considerations and practice which affect the granting of original applications."

In another portion of the Walker-Coy opinion, the distinction between the service obligation of a telephone company and that of a commercial radio carrier was again discussed as follows:

"Mutual is primarily a telephone company, interested in developing that service, whereas RCAC is principally a radio-telegraph carrier, basically interested in developing the telegraph service. At present, RCAC provides both radio-telephone and radio-telegraph trans-oceanic service at its stations in Hawaii. Its personnel must necessarily divide their activities between these two services. If Mutual's application were granted, its personnel would devote their entire attention and efforts to the radio-telephone service."

• • •

The National Labor Relations Board recently decided a case involving a pair of affiliated telephone companies and, thereby, settled two rather important points of collective bargaining policy which may well be of interest to other telephone companies having similar operating conditions. The two points were: (1) That the operators of so-called "agency exchanges" are not

"employes" of the telephone company for purposes of being included in a collective bargaining unit. But they are, rather, to be considered independent contractors in their relation to the telephone company.

(2) That telephone companies corporately affiliated, by reason of being controlled by the same holding company and subject to the same general managerial policies and supervision, may appropriately be included in the same unit for purposes of collective bargaining with an employe union—even though the two companies may operate in widely separate geographical areas.

The two companies involved in this case were Southwestern Associated Telephone Co., Lubbock, Tex., and Prescott Arkansas Telephone Corp. These companies are Independent operating companies and both are subsidiaries of the General Telephone Corp. The case arose upon a petition by the Southwestern Telephone Workers Union for a bargaining election to settle a long-standing dispute between the Communications Workers of America and the International Brotherhood of Electrical Workers (AFL) as to which should be the representative of various plant, clerical, and traffic employes. The NLRB ordered the election to be held on a company-wide basis, including both companies in a single unit (as indicated above) contrary to the argument of the IBEW that separate elections should be held in various operating districts.

It was on the ruling that the owners, operators, and employes of so-called "agency exchanges" are independent contractors that the NLRB split. Chairman Paul M. Herzog dissented with regret that he was unable to share his colleague's view, but the other members of the board, John M. Houston, James J. Reynolds, Jr., and J. Copeland Gray, stated their reasons for so holding at some length.

Since this may well be of interest, if not concern, to other Independent telephone companies and readers of this department, it may be profitable to sketch briefly the NLRB majority reasoning. First of all, there is the description of the two telephone companies' arrangement with the individuals who operate agency exchanges. This is done by contracts known as "agency agreements." The individual contractors are designated as "operating agents." The contract recites that the contractor is "acting as an independent contractor."

A typical agency agreement provides that, in return for the payment to the agent of a monthly compensation, which is determined according to a schedule based upon the amount of revenue collected by the agent and the number of telephones and stations serviced by his exchange, the agent undertakes and agrees:

"Don't be afraid, dear—I haven't been a lineman all these years for nothing."

(1) To operate the exchange on a 24-hour per day basis, in accordance with the operating rules and regulations of the Southwestern company;

(2) To provide at his own expense all operators necessary for the operation of the exchange, and to report monthly, on forms furnished by the Southwestern company, the number of hours worked and the amount paid each operator so hired;

(3) At his own expense, to do, or cause to be done, all work involved in the making and accepting of contract orders, and to collect all revenue due the Southwestern company for services rendered through said exchange;

(4) To make all necessary tests directed by the Southwestern company on telephone lines and the agency switchboard, and to make such reports concerning the lines and equipment as the latter may require.

Pursuant to such agreement, an exchange switchboard and other agency equipment are placed by the Southwestern company in a building it owns or leases, and the Southwestern company undertakes to maintain and repair the switchboard and its equipment. Living quarters in the same building are furnished to the agent free of rent by the Southwestern company, which is specifically accorded access at all times to the agency premises and the agent's quarters. The agent, however, pays all charges connected with the heating, lighting, and servicing of the exchange premises and his quarters.

These contracts are normally in force for a period of one year, subject to termination by either side on 30 days' notice. (There is also what apparently seems to be an emergency provision for giving the company a right to cancel the agreement on one day's notice.)

These "operating agents" are not covered by the benefits of vacation, sick leave, and other welfare plans which the telephone company extends to its regular operating employes. However, the Southwestern company does pay premiums on workmen's compensation insurance covering operating agents. The company also makes tax deductions and pays excise taxes on the same, under the provisions of the So-

(Please turn to page 64)

ABC of the Telephone

By FRANK E. LEE

LOCATING trouble in the subscriber's instrument circuit, generally, is a relatively simple procedure if two important factors are considered:

(1) The repairman should be familiar with the instrument circuit.
(2) A testing routine should be developed in order that the nature and general location of the trouble can be determined by a few simple tests.

For a repairman to be familiar with the instrument circuit means knowing how the circuit functions, and, also, knowing the wires, switchhook contacts, and apparatus used to make up the primary, secondary, and tertiary (when used) portions of the complete circuit. Schematic drawings of the instrument circuit, prepared especially for the purpose, will prove to be a definite help in this part of the fault locating procedure.

Perhaps these schematic drawings have been prepared and are available. If not, the necessary drawings can be made in a short time by any repairman. When in final form, these drawings can be placed on a 3 in. by 5 in. card for ready reference in the field. To protect the card a lucite protective envelope can be secured at practically any stationery supply store.

PART XXXIII. The 32nd article in this series appeared in the Feb. 21 issue, page 11.

This system of placing drawings on handy cards, or in a notebook in which they can be carried for ready reference, will prove to be an invaluable tool in fault locating work. Here's the reason. The average telephone exchange repairman must be familiar with a large number of circuits—switchboards, key equipment, booster circuits, etc; these in addition to the instrument circuits.

While memorizing all of the details of such a large collection of circuits is physically impossible, the details should be available when needed. The best solution lies in a well-balanced knowledge of circuit fundamentals, plus knowing where to find detailed information when and as required.

Worth mentioning at this time, is that installments to follow will discuss the analysis of circuits in which relays and other units of telephone apparatus are involved.

The aim of the discussions will be to set forth ideas that will help the repairman develop workable fault locating procedures covering the various circuits in use in the exchange area. In the more complicated circuits, as in the instrument circuit, memory aids are important fault locating tools.

Development of instrument circuits was discussed in Part VIII of this series which appeared in the Mar. 3, 1945 issue of TELEPHONY. The operating of typical anti-sidetone instrument circuits was the topic covered in Part IX which appeared in the Apr. 4, 1945 issue of TELEPHONY. Both of these chapters are included in the first reprint of this series. (The first 21 installments of this series were reprinted in an 80 page booklet, copies of which may be ordered from TELEPHONY.)

As a matter of review, a typical anti-sidetone instrument actually is made up of three separate circuits:

Primary Circuit (Fig. 1). In this example the *primary* circuit consists of a primary winding of the induction coil and the transmitter. As indicated,

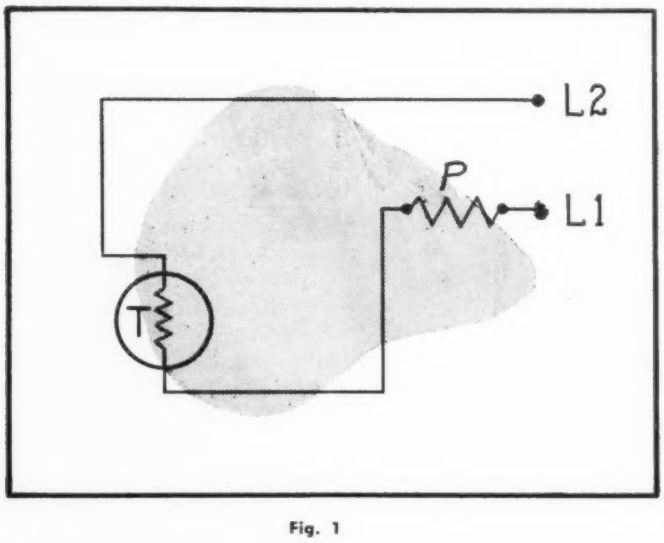


Fig. 1

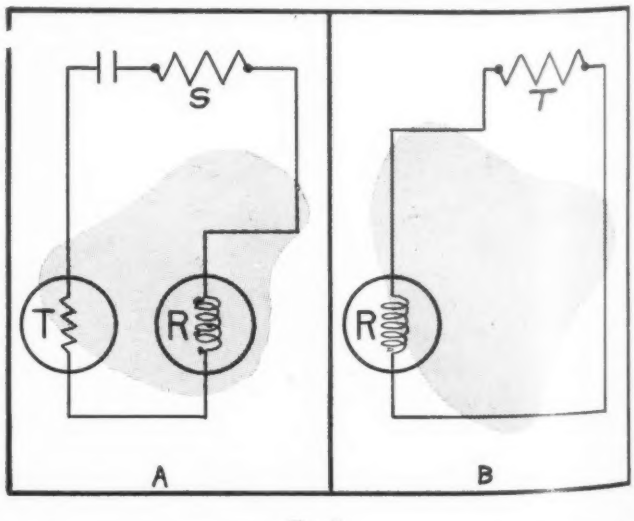


Fig. 2

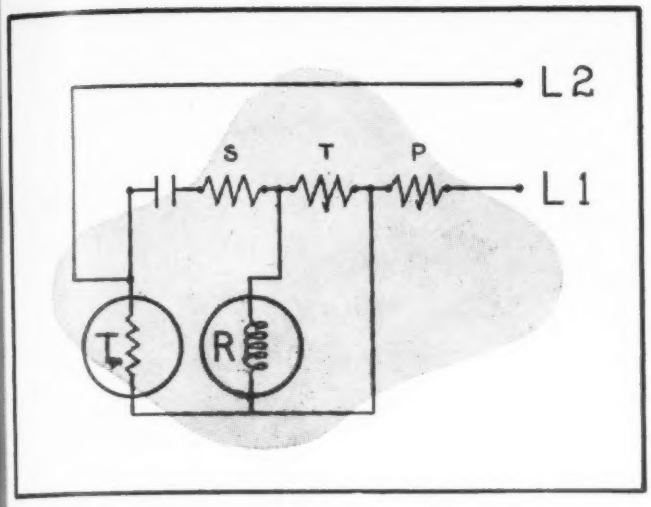


Fig. 3

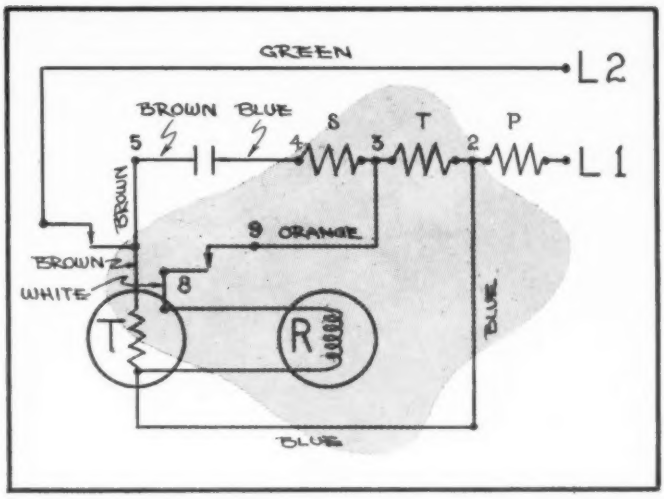


Fig. 4

the primary circuit is connected directly to the tip and ring of the subscriber line circuit.

Secondary Circuit (Fig. 2A). The *secondary* circuit is made up of the secondary winding of the induction coil, receiver, transmitter, and a condenser. These units are arranged in a series network.

Tertiary Circuit (Fig. 2B). The *tertiary* circuit combines the tertiary (or third) winding of the induction coil and the receiver.

When these three separate circuits are combined, the completed subscriber's instrument circuit appears as illustrated in *Fig. 3.* From this circuit the fault locating schematic can be developed.

The fault locating schematic drawing, shown in *Fig. 4,* is complete with terminal designations, wire colors, and other information that will make it valuable in everyday use.

Where to Start the Tests

The nature of the trouble report may provide a clue as to the logical place from which to start testing the subscriber's instrument circuit. As an example, a subscriber calls from a neighbor's telephone and reports, "Can't raise operator," or "Bell does not ring." If the subscriber is located in a rural area, the repairman can make a test or two along the line. However, unless the subscriber has been advised that such a procedure will be followed, the repairman, first, should make a visit at the subscriber's premises, if for no other reason than to advise the customer that the telephone company is working to restore his service at the earliest possible time.

Occasionally, a visit to the subscriber's premises will result in gathering additional important information. A trouble report may indicate, "Can't hear," or "Can't be heard." The first question the repairmen should ask of the subscriber is — "Is this trouble noticeable on all calls?"

Perhaps the answer will be, "No, not on every call, but on all calls to 3257J."

As a general rule, a routine transmission test will prove that the particular line is in proper working order. However, a test call to 3257J should be made and the transmission results observed. Very often a procedure similar to this will lead to the location and clearing of a trouble condition on a line that originally was not reported in trouble.

Incidents of this nature are not unreasonably well-maintained telephone company or central office area can review the line record cards of the exchange and find subscriber lines on which there have been no trouble reports or maintenance visits made in two or three years' time. In fact the managers of many exchange areas are taking the initiative to call these particular subscribers to determine the condition of the telephone equipment located on the premises.

While talking with the subscriber and explaining the nature of the call

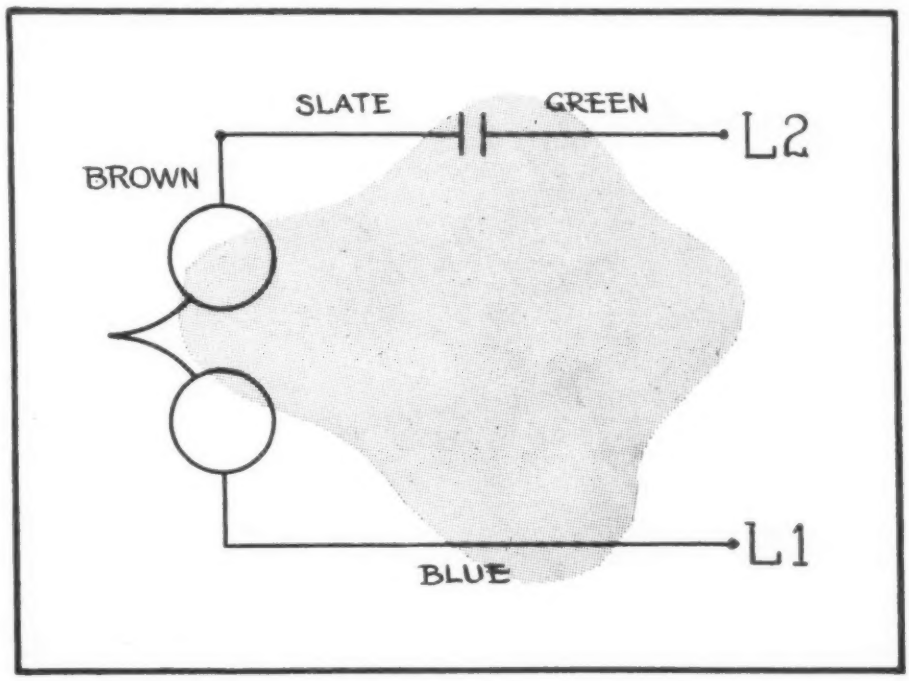


Fig. 5

usual in the telephone business. Some subscribers, and on the whole a very small percentage, will make a service complaint on only the slightest provocation. On the other hand, many subscribers will tolerate an actual trouble condition for a considerable length of time without giving a single thought to reporting it to the telephone company.

Practically any wire chief of any the quality of the transmission is noted. The subscriber is questioned about the service: Are the cords worn? Is the bell box or telephone fastened securely on the wall? Are any parts of the telephone broken or cracked? This type of preventive maintenance activity has a definite spot in the overall maintenance program of any telephone company.

Checking Continuity of C.B. Circuit

When testing the common battery instrument circuit or station equipment the starting point should be a continuity test across the line terminals of the set. If the line circuit tests normal, then, proceed to check the continuity of the various parts of the instrument circuit.

Preparation for continuity Tests 1 through 4, as shown in *Fig. 4*, is as follows:

Place one clip of the test set on Terminal L2. The other test clip will be used to include various portions of the circuit for test. A click in the test receiver as the test circuit is closed and opened indicates the continuity is good. The absence of a click is caused by an open circuit. To locate the "open," move the test clip, point by point, nearer line Terminal L1. When a click is heard at a point toward terminal LI and is not heard at the next point further away, the "open" in the circuit is isolated between the two test points. A typical example of trouble of this nature would be an open conductor in an instrument cord.

Following is the detailed procedure of tests used to locate faults in the subscriber's instrument circuit. *Leave the receiver on the hook or block switchhook contacts in a normal open position, whichever is easier, and proceed with these tests:*

Test 1. Touch Terminal 4 several times to test the three induction coil windings.

Test 2. Touch Terminal 5 to test primary winding of induction coil, two blue cords in series, transmitter and associated contacts in handset handle, and two brown cords in series.

Test 3. Touch Terminal 9. This test rechecks the primary and tertiary windings of the induction coil, and adds a test of the orange instrument cord.

Test 4. Touch Terminal 8 to test primary winding of induction coil, two blue instrument cords in series, wires moulded in handset handle, the receiver and associated contacts, and the white handset cord.

Test 5.

(1) Remove receiver from switchhook.

(2) Transfer test clip from Terminal L2 to Terminal L1.

(3) Open the blue instrument cord at Terminal 2.

(4) Open orange instrument cord at Terminal 3.

(5) Touch opened orange cord to test secondary switchhook contacts, white handset handle cord, wires moulded in handle, receiver, transmitter, brown handset handle cord, primary switchhook contacts, and green instrument cord.

Test for Crossed Instrument Cords

When the original fault locating analysis indicates a short in the circuit, the cause may be found in crossed instrument cords. Obviously, the cross would have to be between cords that would cause a direct connection between the tip and ring conductors of the line. Crosses between other cords may result in transmission complaints such as "can't hear," or "can't be heard."

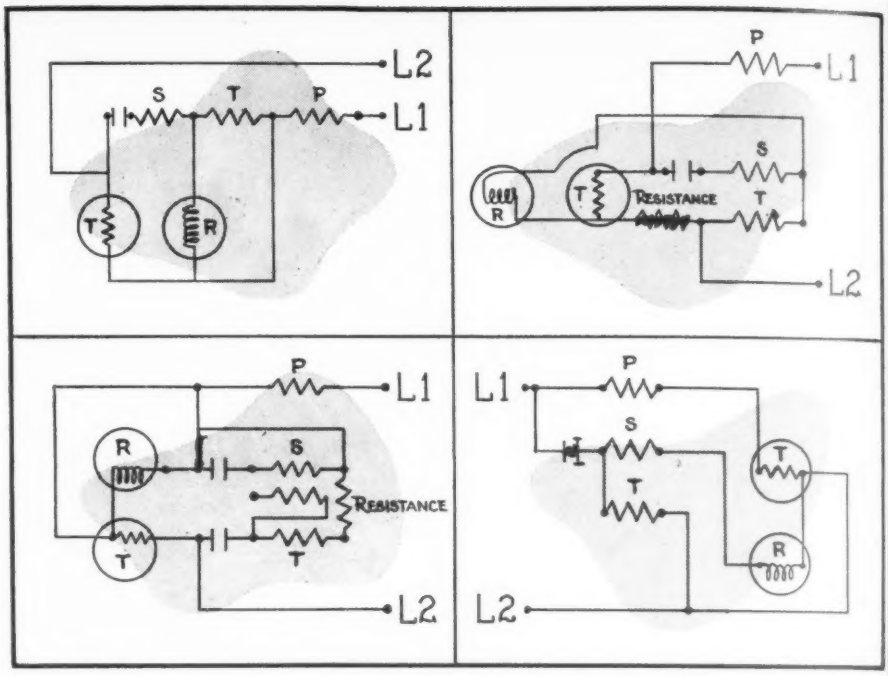


Fig. 6

To test for crossed instrument cords:

(1) Open orange cord at Terminal 3.
(2) Open green cord at Terminal L2.
(3) Open brown cord at Terminal 5.
(4) The blue cord remains closed on Terminal 2, and, thus, is a source of battery or ground for the test.
(5) Place one clip of the test receiver on Terminal L2.
(6) With the other test clip touch each of the opened cords. A click on any of the three opened cords would indicate a cross between that cord and the blue cord.

In a similar manner, through a process of elimination, cross tests can be made to determine if a cross exists between any two of the four cords mentioned above.

To test for crossed handset handle cords:

Part A

(1) Remove or disconnect transmitter and receiver units in handset handle.
(2) Place test clip on Terminal L2.
(3) Block switchhook contacts open.
(4) With other test clip touch brown cord terminal in handset.
(5) Touch white cord terminal in handset. A click on either test would indicate a cross between the tested cord and the blue cord which was left connected to a source of battery or ground.

Part B

(1) Replace or reconnect the receiver unit (Transmitter still is removed from circuit).
(2) Touch test clip to brown cord.
(3) If click is heard (and no click was heard in Part A) a cross between white and brown cord is indicated.

Test Condenser for Open or Short. An open condenser would result in a report of "can't hear," whereas, a shorted condenser would result in a trouble report of "can't be heard," because the booster feature built into this type of circuit would be lost.

To test for shorted condenser:

(1) Open blue condenser lead at Terminal 4.
(2) Place one clip of test receiver on Terminal L2.
(3) With the other test clip touch the opened blue lead several times.

NOTE: A click heard each time the blue lead is touched would indicate a shorted condenser because the direct current on the line is passing through to the other side of the condenser which is connected through the instrument circuit to Terminal L1.

To test for open condenser:

(1) Place one test clip on the opened blue condenser lead.
(2) With the other clip, alternately touch Terminals L1 and L2 several times.

NOTE: A click heard each time L1 and L2 is touched indicates the condenser is charging and discharging in a normal manner. As a result, the condenser is not open.

Ringer Circuit Tests

Ringer Condenser Test. The ringer condenser can be tested in the same manner as outlined above for the test of the condenser in the talking circuit.

Ringer Coil Test. Generally, one coil of the station ringers is connected directly to one side of the line. The other coil is connected through a condenser to the other side of the line or to ground according to circuit requirements. A metallic ringer circuit is shown in *Fig. 5*.

To test ringer coils for continuity:

(1) Open brown ringer lead.
(2) Place test clip on Terminal L2

INSTRUMENT CIRCUIT TROUBLE ANALYSIS CHART
(Common Battery Exchange Area)

Circuit Unit	*Nature of Trouble*			
	Can't Hear	Can't Be Heard	Can't Signal Operator	Bell Does Not Ring
Transmitter		Open Short Packed Diaphragm blocked*	Open	
Receiver	Open Short Diaphragm bent Diaphragm blocked*			
Switchhook	Open	Open	Crossed Open	Crossed
Condenser				
—Talk Cct.	Open Short	Short		
—Ringer Cct.			Short	Open Short
Induction Coil Windings	Crossed			
—Primary		Open Short	Open	
—Secondary	Open Short			
—Tertiary	Open** Short			
Ringers				Open Out of Adjustment Blocked*
Instrument Cords	Open Crossed	Open Crossed	Open Crossed	Crossed
Receiver Cord	Open Short			

(*) The word "blocked" indicates the presence of foreign material that prevents the proper operation of a moving part.
(**) Where excessive sidetone is present in an anti-sidetone circuit.

Table I

which is connected to side of line opposite that to which other coil of ringer is terminated.

(3) Touch opened brown ringer lead several times with other test clip.

NOTE: Clicks in the test receiver indicate there is continuity through both ringer coils. The high resistance of the ringer coil windings will reduce the volume of the clicks heard in an "OK" ringer test as compared with other test previously described. A loud test receiver click would tend to indicate a short in the ringer coil windings.

Comparison Test of Units in Circuit

In the event no trouble is found by the standard routine tests outlined in preceding paragraphs, a comparison test should be made of various units in the circuit. If the trouble report is "can't be heard," replace the transmitter or transmitter unit. If this does not clear the trouble, the cause may be a low volume output induction coil. To check this possibility, remove and replace the induction coil with another coil that meets the manufacturer's specifications. Then, compare the results.

On a report of "can't hear," compare the results when a new receiver or receiver unit is installed. If this does not clear the trouble, check the induction coil in the manner mentioned above.

Schematic Drawings of Instrument Circuits

The fault locating drawing, shown in *Fig. 4*, represents a typical instrument circuit. Terminal designations and cord colors were assigned arbitrarily merely to assist in bringing out how the circuit tests described were developed.

By following the same general principles of circuit testing, fault locating schematic drawings can be prepared on any desired telephone circuit. To assist those men in the field who wish to prepare their own drawings, schematic drawings of four typical instrument circuits, including the circuit used for the purpose of this discussion, are included in *Fig. 6*.

Checking over the wiring of the instruments in use in the exchange area with the aim of matching up a particular circuit with one of these four drawings will increase familiarity with both the circuit and the apparatus. These circuits are not intended as exact reproductions of any particular circuits. However, they all can be used as patterns to which a few minor alterations or additions can be made. Thus, useful drawings can be developed. Actually, because of familiarity gained during the developing process, the completed drawings should be of greater value to the man in the field than would tailor-made originals.

Fault Locating Chart

Table I, entitled "Instrument Circuit Trouble Analysis Chart," covers the fault possibilities for units in the subscriber station equipment circuit. Across the top of the chart are listed the four main classifications of subscriber trouble reports. Listed below these headings are the fault possibilities of the various circuit elements involved. This particular chart was prepared on the common battery instrument circuit.

(To Be Continued)

telephony's ***SAFETY*** bulletins

No. 4—Pliers. When you think of pliers remember these three extremely important points: (1) Use a good pair of pliers designed for the job at hand; (2) Get in a safe working position; (3) Always use natural leverage instead of brute force.

by FRANK E. LEE

QUICK as a cat can wink an eye—yes, even quicker than you can wink an eye—that's fast, mighty fast. That's as fast as clipped ends of wire can fly through the air unless special precautions are taken to keep them under control.

Practically every telephone man who has worked with heavy line wire, drop wire, or other types, knows that a clipped end of wire is dangerous—often more of an accident hazard than a bullet from a gun. Generally you know where the bullet is going but you can never be sure where the wire clipping will go. All too frequently that place is into the worker's eye, with serious consequences. For this reason, a few minutes of review on the safe use of pliers is an excellent investment for the fore-*see*-able future.

Why discuss pliers? Pliers are as common to the telephone man in his work as are a knife and fork at the dinner table. It is easy to fall into careless habits when a tool is used frequently. During a recent discussion of the use of pliers on poles, one of the younger men mentioned "I've had the pliers slip off a wire a few times, and maybe I've dropped the lineman's pliers from a pole four or five times, but I've never had an accident." At this point a lineman with more experience replied, "Jack, the fact that there was no injury only means your luck was good. Every time that happens to me, I check to see why it happened."

After further discussion, the group decided the second man was right. An accident should be called an accident, whether or not anyone is injured, with a re-check being made to avoid similar mishaps in the future.

All pliers for telephone work fall into two general classifications: (1) Wire handling pliers, and (2) Pliers designed for other uses.

Actually, all of the pliers used in the telephone business have been developed for specific uses. For this reason, the first requirement in the safe use of pliers is to be sure the right pair is being used for the job.

LINEMAN'S PLIERS (SIDE-CUTTING)

These are rugged, heavy-duty pliers designed to stand the stress and strain of handling line wires. They also are used to cut drop wire, outer insulation and all, and for similar heavy cutting and twisting operations. The inside of the jaws are knurled to help prevent wire slipping.

DIAGONAL CUTTING PLIERS

Generally, pliers in this classification are lighter in weight and are designed to cut smaller or softer wires. These pliers are also used to remove insulation and to scrape the bare wire clean before making terminal connections or splices.

LONG NOSE PLIERS

Long nose pliers are used for work in a small or restricted space. They are used *only to terminate wire*. The inner edge of the jaws is knurled to get a better grip on the wire and to prevent wire slippage. It is well to keep the knurled section keen edged, by avoiding the use of these pliers to clean wire.

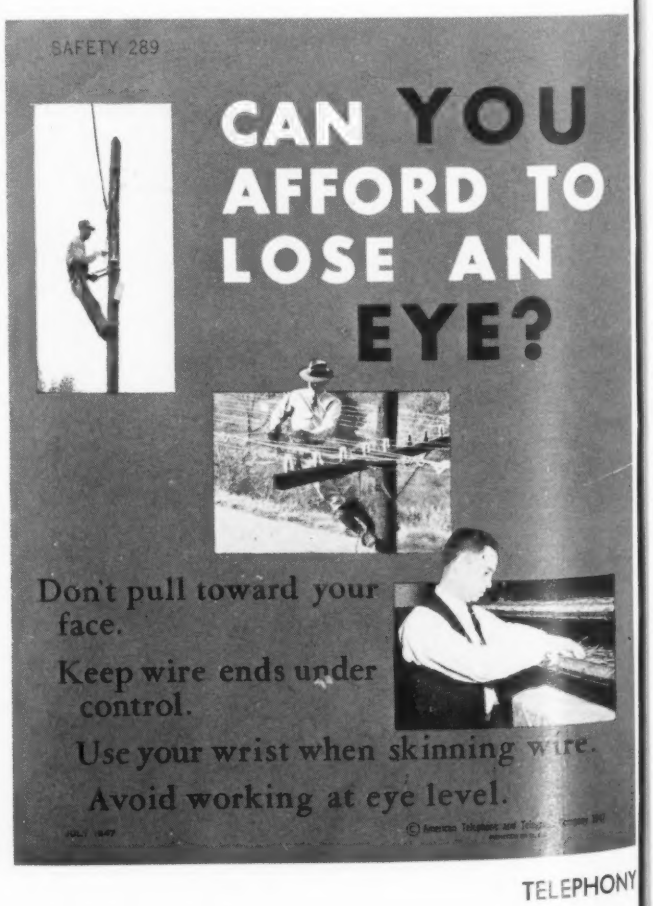
FLAT NOSE, DUCK BILL, AND OTHER SPECIAL PLIERS

Pliers of this type are designed for making certain relay adjustments and to facilitate maintenance operations on other items of apparatus. These are made with smooth jaws and are not to be used for wire handling.

Working Position: Correct working position is an important factor in the safe use of pliers, or any tool, for that matter. As a general rule, keep the face above the work and out of line with direction in which pliers are moved in work operations. Where it is impossible to keep the face above the work, at least keep it out of line of motion. Where space is confined, as under a desk or table, use the free hand to control the movement of the other. Then, if anything should happen and the pliers slip, injury may be prevented.

On poles there is generally plenty of head room to permit a position above a terminal or cross arm, where the work will be about in line with the stomach.

Leverage: One of the latest ideas on the safe use of pliers involves the use of a rolling or twisting of the wrist and arm to terminate wires at cable terminals or other connecting points. In this way the heavy drop wire is *formed* around the binding post, rather than using a pulling motion to *force* the wire into place. This new method has three distinct advantages:


SAFETY 289
CAN YOU AFFORD TO LOSE AN EYE?
Don't pull toward your face.
Keep wire ends under control.
Use your wrist when skinning wire.
Avoid working at eye level.

(1) There is no flexing motion of the upper arm muscles to pull the pliers towards the face in the event grip on the wire is lost.

(2) The completed job is better from the mechanical standpoint.

(3) Any force required to start the wire around the binding post takes the form of a pushing motion which will be *away* from the face.

Removing Insulation: As mentioned previously, the right tool for this job is the diagonal cutting pliers, or on extremely heavy wire, the side-cutting pliers. Always work the pliers away from the body and keep the hands under control. Permitting the hand and pliers to pull free of the wire may cause an injury to a fellow workman, or result in the hand being injured against a terminal block or other sharp object. Where leverage is required to pull insulation off a piece of wire, follow this procedure:

(1) Grasp the wire in one hand, and close the hand like a fist.

(2) Place wire in wire stripping notch of diagonal cutting pliers or carefully close jaws on insulation, and close hand like a fist.

(3) Place knuckles of hands together and develop leverage through a rolling motion of the hands. In this action, the fingers act as pivot points and roll towards the little fingers. A little practice will permit removing insulation without damaging the wire itself. This method develops more pull and is safer, by far, than using muscles of the upper arm for the same operation.

Cutting Wire: When cutting wire, both ends of the wire —the used end and the end not used—should be kept under control. Wire under tension may recoil and fly in any direction when cut. If you think the wire might recoil towards the body or face, keep it under control by holding it in your hand.

A drop, closed down at a cable terminal, will be held under control. When trimming the free end of the wire, hold one hand over the wire to stop the clipped end.

When cutting scrap ends of wire, hold the flat edge of the cutting pliers towards the body. Thus, if the free end tends to fly, the direction will be away from the body.

Carrying Pliers: Many minor accidents are caused by improperly carrying tools. Always avoid carrying pliers or other tools loose in overall or trouser pockets. Pointed edges of pliers protruding from a pocket are a constant accident hazard to the workman and others around him.

Well designed, convenient tool pouches are available at little cost, and are recommended to anyone who uses pliers or tools in telephone work. These tool pouches prevent loss as they provide a definite spot for each item. When a job is completed a moment's check of the pouch will reveal any mislaid tool. Also, when tools are carried in a pouch, the chance of dislocating one tool while reaching for another is minimized.

Plier Inspection: Pliers which are in proper condition are safer and easier to use. A drop of light oil will keep the joints clean and will make the tool easy to open and close with one hand. Cracked or chipped pliers should be replaced without delay. If the joint becomes loose and allows excessive side play, the tool also should be replaced.

Cutting edges should be true and sharp. Hold the pliers up to the light and observe that the cutting edges come together properly. If a spot of light is seen between the blades, cutting efficiency of the pliers will be impaired. A few careful strokes with a fine file will generally correct blades that are slightly dull.

In summary, pliers, like most other tools, are designed for specific uses. To be safe yourself, and to insure the safety of others, use the correct type of a quality grade of pliers on every job. A good workman deserves good tools. A good workman always remembers, "*You have time for safety!*"

Two-Way Radio-Telephone In Switzerland

Zurich, Switzerland's Post Telephone-Telegraph Co. last fall took advantage of war-impelled communication developments and installed Motorola FM two-way radio-telephone equipment as an experimental extension of its land-wire telephone system.

Philips Export Corp. reported through their New York representative, Douglas A. Smith, that the experimental system consists of a 50-watt central station on the 160-mc. band and 30-watt mobile units.

He said, "Although the antenna of the central station is mounted in the center of town only 90 ft. above the street we obtained better results than expected."

In order to make a coverage survey, radio engineers drove approximately 1,200 miles in and around the Zurich area.

The Philips company reports that communications are excellent even in the valley behind the Uetliberg Mountain, towering 1,000 ft. above the surrounding terrain. "We were startled to observe continuous communications through a 600-ft. tunnel in Zurich," the company said.

V V

J. G. Wray Dies; Telephone Engineering Authority

James G. Wray, internationally-known telephone consulting engineer, founder and, for many years, president of J. G. Wray & Co., Chicago, Ill., died Apr. 14 in his home in Highland Park, Ill.

Mr. Wray had a long and distinguished career in the telephone business, both in the operating and consulting fields. He became associated with the industry in 1893 when he joined the old Chicago Telephone Co. He was chief engineer of the company when he left it in 1916. From that time until his retirement a few years ago he served many telephone companies, state commissions and cities as a communications consultant. On occasions his assignments took him to Europe, South America and Asia where he represented both private and government communications systems.

He leaves his widow, Clara M.; a son, James G. Jr.; five daughters, Mrs. John A. Bailey, Mrs. Alan H. Ward, Mrs. Stanley D. Grace, Mrs. John D. Emerich Jr., and Mrs. Alvin V. Mitchell; two brothers, and one sister.

V V

Coca Cola to Salute Telephone Employes

Telephone employes throughout the country will be on the receiving end of a radio "salute" Apr. 30—and it should be "good listening." Coca Cola's regular Friday night coast-to-coast broadcast, with Spike Jones and the Spotlight Revue, will do the saluting.

Spike, the star of the show, is appearing in the larger cities of the United States for these broadcasts. On Apr. 30, he will be at Medinah Temple, Chicago. The Telephone Pioneers Association of Illinois Bell Telephone Co. (about 4,000) will attend as studio guests and will "take a bow" on behalf of all telephone employes.

The program will be carried by Columbia Broadcasting System from 9:30 to 10:00 p.m. Chicago Daylight Savings Time. The Chicago outlet is Station WBBM, and there are 168 other outlets throughout the United States and Canada.

THE PLANT MAN'S NOTE BOOK

BY
RAY BLAIN
TECHNICAL
EDITOR

WE are indebted to C. A. Swoyer, Columbus, Ohio, for a copy of "The Ohio Bell" which describes vividly how a sleet storm made history back in 1909.

It was on Mar. 4 of that year and President Taft was being inaugurated in Washington. While the world waited for news of this great event, ice formed on all aerial wires around the nation's capital, causing them to become so heavy that they sagged and snapped.

For hours, Washington was isolated, telephonically and telegraphically, from the remainder of the country. Valiant work, the historians record, was performed by line gangs in restoring service as promptly as possible, but to John J. Carty, chief engineer, and Theodore N. Vail, president of AT&T, the failure of the wires at this particular moment spelled defeat.

More and more they had been directing their thoughts to a steady advance toward the goal of universal service throughout the nation and here was a stern rebuff from nature. It was clear to them that the way to forestall the recurrence of such an interruption to service was to speed up the placing of telephone wires in cables.

Several years prior to the disastrous sleet storm of 1909, Vail and Carty started a series of experiments at Attleborough, Mass. to determine exactly what could, and what could not, be done with wires that were buried in the earth. A five-mile trench was dug beside a railway track. This work was performed cheaply by the labor saving plan of hitching a locomotive to a plow. Then, into this trench were laid wires with every known sort of covering. Most of these wires were wrapped with rubber or gutta-percha, after the fashion of a submarine cable.

Several weeks later, the first two cables for actual use were laid in Boston and Brooklyn, and, in 1883, Engineer J. P. Davis was set to grapple with the problem of putting a complete underground system in the wire-bound city of New York. In 1890, West Street in New York was a mud quagmire. Telephone poles rose to a height of 85 and 100 ft., and were covered with as many as 30 crossarms.

An important discovery in the manufacture of cable that still makes it the durable voiceway it is today was made in 1885 by John A. Barrett. In a little wooden shed in the backyard of a Brooklyn foundry a machine was developed that could be made to mold hot lead around a rope of twisted wires. This was a notable discovery for it meant tight covering for cable. It also meant a victory over that most troublesome of enemies—moisture.

Developments and improvements were made rapidly from that time on, and the next step was to connect cities with the early cable. In 1912, talking through underground cables, for the first time between New York and Washington represented the longest distance underground yet achieved and, during 1913, it became possible to talk satisfactorily by underground wires the entire distance from Boston to Washington.

Cable networks now cover our nation and a sleetstorm disaster of the type that paralyzed our communications system in 1909 would stand no chance of repeating this situation.

• • •

Guest lectures are now being delivered by long distance telephone to classrooms at Princeton University. An amplifier has been hooked up to the telephone located in the lecture hall so that prominent men in politics can address the students by remote control for the course "Political Parties."

Students are able to ask questions over the two-way connection after the talks.

• • •

A new attachment for an electric hand drill which permits the user to sand, drive screws, polish, grind, file, in addition to sawing wood, steel, plastic and other similar materials, should prove extremely useful on all telephone line and maintenance trucks.

These attachments are light in weight and convenient to use as no special skill is required to operate them.

• • •

The writer enjoyed a visit recently with Rogers Case, a communications engineer with over 40 years' experience. He showed us an article published in "Telephony" back in 1931 which described a line built by Mr. Case over the Andes in Columbia, South America.

This engineer is now very busy developing a line of lightweight pole line hardware which appears to have many worthwhile possibilities. The point type transposition bracket is made of magnesium and is available in both the pole and span types. These brackets may be equipped with glass insulators with rubber bushings or with rubber insulators.

• • •

It has been said that: "Men are like steel. When they lose their tempers, they are worthless."

• • •

According to *"Telephone Topics,"* some telephone men recently went to work on a bull's stomach, but this action had nothing to do with the rural expansion program.

It seems that a $15,000 prize bull, known as "Inka" ate a piece of metal and came down with a liver ailment which caused him to lose 400 pounds in a short period of time. Veterinarians rushed to the spot with x-ray machines, but they couldn't get under Inka's skin. It was too thick. It was then they contacted the telephone company and borrowed a tone set and an exploring coil used to locate underground pipes and cable. This detector soon found the metal in one of the bull's four stomachs.

• • •

About 65 per cent of all the telephones in the Bell System are now dial operated.

• • •

We are in receipt of a letter from H. M. Stewart, president of the Standard Telephone Co. of Cornelia, Ga., in which he calls attention to an item which appeared on this page concerning the practice of attaching signs to telephone poles. Milt states that they

have found that rendering statements and insisting upon payment for use of poles has been quite effective in reducing this abuse. This is a novel idea and one that any telephone company should be able to use to advantage.

• • •

A new type of building insulation claims a double action as it reflects radiant heat in addition to blocking heat transfer by conduction and convection.

This insulation is made up of a fluffy fiber blanket and two non-corroding reflective metallic membranes that completely inclose it. The millions of dead air spaces in the fiber blanket provide an effective barrier to heat transfer, by conduction and convection. This action, plus the action of the reflective metallic membranes provide insulating efficiency that can be translated into great fuel savings and more comfort both for summer and winter.

PLANT MAN'S QUIZ

Q. Our company operates two metallic lines each about 12 miles in length which are heavily loaded with stations. These lines connect two exchanges and the transmission is very poor over the entire line. The transmission, however, is good from the center of the line to either exchange. Can you advise us as to how we may be able to improve this transmission problem?

A. In our opinion, there is no doubt but that you have some excessive losses in the line. It is suggested that you cover this line carefully from one exchange to the other. Look for high resistance splices and rusty wire. If you find either, cut them out. Use compression type sleeves to make all splices. Replace all missing or broken insulators. Trim all trees to clear the line. Make certain that there is no ground on the line or in any of the protectors. Inspect all jumper connections on the main frames to see that they are soldered properly. If the line is noisy, check for power induction; it may be necessary to retranspose.

It is believed that if these corrective measures are taken, your low transmission trouble will be overcome.

• • •

Q. We plan to mount some repeating coils out on the line and desire advice as to whether line protectors should be provided. Also please tell us what type of housing is required in order to protect coils from the weather when installed in this manner.

A. Coils installed out on the line should be equipped with lightning protection on each side. It is suggested that you procure repeating coils installed in a weatherproof mounting and equipped with standard protectors from your telephone supply house.

The one-coil type is equipped with a three-pair protector and the two-coil type a five-pair protector. It is believed that these specially designed protectors will prove a good investment for your company.

• • •

Q. Why is the diverter pole generator considered desirable for the charging of storage batteries on a telephone system?

A. The use of this type of battery charger proves especially desirable in telephone exchanges where the generator takes the greater part of the exchange load and charges the battery during the partial or no load periods.

The principal advantages of this type of generator are as follows:

(1) Stable in operation during low load or heavy load demands and free from objectionable commutator ripple.
(2) Automatically transfer to the battery in emergency any current demands beyond the normal capacity of the generator.
(3) Automatically returns to their original voltage when the load drops back to normal.
(4) Capable of delivering their rated current capacity at a sufficiently high voltage to accomplish a quick recharge of the battery following any prolonged power interruption as well as for an occasional overcharge of the battery.
(5) Free from any characteristics of "running away" or reversal of polarity in the event of a power interruption.
(6) Capable of maintaining the voltage steady so that relay adjustments will not be affected by great degrees of variation.

• • •

Q. What are pads and how are they used in voice frequency circuits?

A. Although attenuation in a line is usually undesirable, there are times when it is highly desirable. When the output of a repeater or a source of test power is greater than desired, attenuation is introduced intentionally. In this case, a resistance network known as a "pad" is used to insert intentional loss in a circuit.

A pad always has two properties, the loss it presents to voice currents, expressed in db; and the impedance it presents to the circuit in which it is connected in ohms. The pad can be designed to provide any desired amount of loss. If the pad is made of pure non-inductive resistance, the loss will be practically the same for all frequencies.

The specific loss of a pad holds true only when the pad is connected in a circuit which presents the same output and input impedance as the pad.

If the impedances are not matched, a reflection loss will be introduced in addition to the losses of the pad itself. Due to the fact that most telephone equipments are designed for a 600 ohm impedance, pads are usually designed to match lines having this characteristic.

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Q. We should appreciate information as to what types of pressure testing cable plugs are now in common use and how these are constructed.

A. Cable pressure plugs generally are divided into two classes, end and intermediate. End plugs are used when the cable on only one side of the plug is under pressure. In this case, the plug prevents the escape of gas from the end or a branch cable into the atmosphere, or into another cable that is not under pressure. Intermediate plugs are used to divide the cable into gas sections. In this case, the cable on both sides of the plug is under pressure.

In the early days of gas pressure cable testing, plugs were made by introducing wax into a sleeve or a short length of the cable. The wax flowed around the paper insulated conductors and completely filled the sleeve or sheath and formed a dam that prevented the flow of gas. It was soon learned, however, that shrinkage and cracking occurred during this procedure as the solidified mass of wax aged. This action created fissures through which leakage occurred. Moreover, differences in the expansion characteristics of wax and lead had a tendency to break the bond between the sleeve or sheath and wax at low temperatures.

The above difficulties were overcome by making a gas plug which utilized both wax and a non-hardening asphalt compound. In this type of plug, the wax seals the voids in and, under the paper insulated conductors and the asphalt, fills the spaces between the conductors and the sheath. This type of plug can be made to operate in either the horizontal or vertical position.

IOWANS EXPAND HELP

For Small Companies

By R. C. RENO

THE Iowa Independent Telephone Association took another step forward in its already accelerated program of providing assistance to the small mutual telephone companies in that state at its annual convention held Apr. 6 and 7 in Des Moines.

President W. H. Fowler, Pella, announced the appointment of a special committee to investigate ways and means by which the association can help the smaller units to get their "house in order" and to improve their service. The committee also will assist the association's secretary, W. F. Miller, in the special work that he is doing to help the mutual and cooperative companies.

Members of the special small company committee are C. C. Pearce, Riceville, chairman; H. C. Amick, Des Moines, connecting company representative, Northwestern Bell Telephone Co., and H. J. Hopkins, Jessup. Mr. Pearce was given authority to add to the membership of the committee as the need arises.

The Iowa association is the second state association within the past few weeks to form committees to assist small telephone companies. Recently, L. W. Reynolds, president of the Michigan Independent Telephone Association, appointed two committees—(1) a Fact-Finding Committee to investigate service complaints arising in exchanges of the smaller companies, and (2) a Policy Committee to study the report and activities of the Fact-Finding Committee in order to arrive at some workable solution to the small companies' problems.

Much of the discussion at the Iowa Convention emphasized the importance of the entire industry directing as much attention as possible toward helping the small companies to improve their financial and operating conditions.

President Fowler, in his annual address, stressed the need for telephone companies with low rates to immediately sell the public on the necessity of higher rates in order to pay good wages, to cover operating expenses and to provide fair earnings in order to attract the additional capital needed for the reconstruction and expansion of their plants.

He said the day of $1.00 and $1.25 rates is past and it was his opinion that if telephone companies will improve service and explain their needs to their subscribers they will have little difficulty in securing adequate rates.

He stressed the need for all telephone companies to gear up their public relations program. Public sentiment and goodwill, he said, are two of the most sensitive things telephone companies must deal with and everything must be done to give just a little better service than is expected by the public.

He emphasized the need for continued harmony and cooperation on the part of all units of the telephone industry, recommending that all operating companies support their state associations so that all segments of the business can play their part in solving the many problems facing the industry today.

The president commended the cooperation rendered by Independent manufacturers and suppliers who have made it possible for the Independent industry to survive and progress.

One of the main activities of the Iowa Association has been directed towards helping small mutual telephone companies, Secretary Miller stated in his annual report. He called for the cooperation of the large companies in rendering assistance to these companies which serve many of the small rural communities of Iowa. He warned that if immediate help is not given to many of the "crossroad" companies, they either will have to be taken over by larger companies or give way to other agencies who will provide better service.

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Discussing the program of the Iowa convention are, left to right: R. C. RENO, Editor of TELEPHONY; Association Secretary W. F. MILLER; MRS. MILLER and President-Elect CLYDE McFARLIN.

Line Maintenance

Mr. Miller commended TELEPHONY for its interest in the small company situation during the past several years, and pointed out that as a result of circulating reprints of a recent article from this publication reporting the reorganization of a mutual company in Michigan, some companies in Iowa had reorganized and put their affairs on a sound operating and financial basis.

Mr. Miller, who spends considerable time in the field among the small companies, was commended for these activities.

The use of microwaves in developing radio relay systems and other interesting technical developments were discussed by C. D. Peebler, Des Moines, executive assistant, Northwestern Bell Telephone Co.

Leon F. Roberts, Chicago, a director of the United States Independent Telephone Association, and general representative of the Gary Group operating companies, represented the USITA and addressed the convention on "Public Relations and the Balance Sheet."

Emphasizing the importance of proper public relations in the conduct of all phases of the telephone business, particularly in connection with obtaining adequate rates, Mr. Roberts stressed that, in promoting and maintaining good relations with the public, adherence to the Golden Rule is the best practice to follow. Following this philosophy cannot help but promote the best in public good-will, he said.

He stated that good public relations is an invisible, but priceless, asset on the balance sheet of any telephone company and could be termed a factor making up the "going concern value" of the company. That asset should be guarded and improved on a continuous basis, Mr. Roberts stated.

Those in charge of the registration desk were kept busy registering the record attendance at this year's Iowa convention.

"Good plant — good service — good rates" was the keynote of the address of Ray W. Smith, Chicago, editor, Telephone Engineer, who spoke on the subject, "An Editor Views the Telephone Industry."

Mr. Smith said, "The industry's situation has and is being partially alleviated to some extent by increased exchange rates. In Iowa, we know Independents recognize that good plants and good service depend upon good rates."

Urging the improvement of farm service, Mr. Smith said that farmers want and expect good service and are willing to pay for it. With prosperity prevailing in most farm areas, there has never been a better time to straighten out the farm situation, he stated.

"A great majority of telephone subscribers would prefer to pay adequate rates for telephone service than to have inferior telephone service," he said. "The principal question in the public mind about a proposed rate increase for any utility service is that of whether or not the increase is actually justified. If the public is shown that it is justified, there is seldom any widespread objection to it."

Don Reid, Des Moines, managing director of the Iowa Press Association, in an address on "Incentives" spoke of the threat to the American way of life by those who promote foreign ideologies, stating that if we are to maintain the tenets of Americanism, we must preserve it and make it work in local communities. He urged that Iowa telephone people "make your community the finest place in the world to live. It can become the stronghold of our American way of life." If all of our citizens will uphold and practice our democratic processes in their communities, the threat to our system will be eliminated, Mr. Reid said.

In an address "The Small Exchange," H. L. Dowd, Des Moines, general commercial manager, Northwestern Bell Telephone Co., stated that there are some small mutual or cooperative telephone companies that are not giving the best of service, which has resulted in complaints from subscribers in various communities. He stated that it was up to the industry to help these companies improve their plants so that the quality of the over-all service rendered by the industry is maintained on a high level. He commended the Iowa association for its efforts to help the smaller companies reorganize and im-

(Please turn to page 63)

Groups of Iowa telephone men photographed as they were assembling for one of the sessions of their recent convention.

THIS RURAL PARTY LINE

Is No Longer a Joke

By LEON F. ROBERTS
General Representative
Gary Group Operating Companies

Enterprising Iowa farmers rebuild decadent mutual, subscriber-owned lines into brand-new, modern system, and prove that switchers are not always a necessary evil.

MAN always has been intrigued by the sound of his own voice. With the invention of the telephone, he became intrigued with the voice of his neighbor, especially if he happened to be on a rural party line, and, since the memory of man goeth back not, the rural party line has been the butt of many a joke.

But farm telephone service is being improved now in many areas, and poor rural service no longer is considered funny. In fact, it never was considered funny by those engaged in the telephone industry, and how to provide good rural service at a profit, or at least without a loss, or subsidization, always has been a No. 1 industry problem. It is well known in the field, too, that one of the chief reasons for talk of a federal rural telephone agency was the run-down condition of mutual, subscriber-owned lines in all parts of the country. Poor service usually results from failure of the subscribers to maintain their own lines, but invariably the local telephone company, which switches the lines, is blamed for the inferior type of service given.

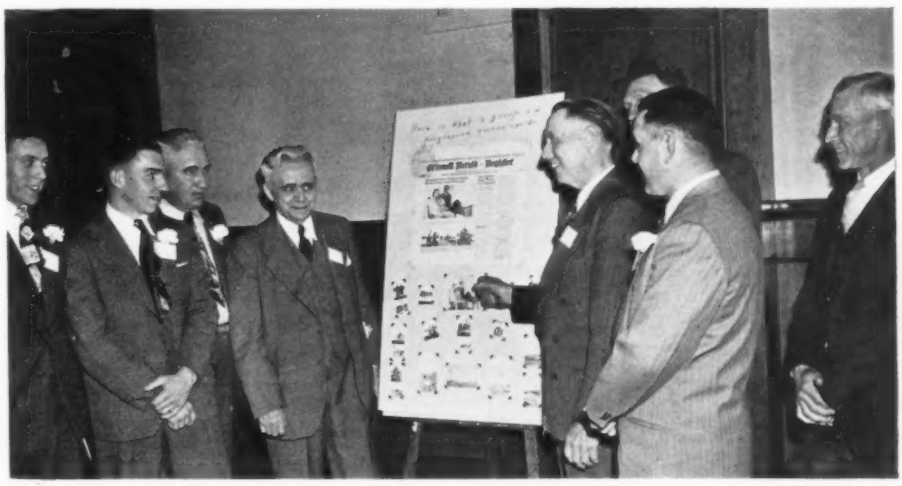
One of these lines, until recently, existed in the farm country south of Grinnell, Iowa, where 93 farmers, finally deciding to do something about it, have just completed building themselves one of the best telephone systems to be found anywhere. The story of how they did it, and how they are now operating their own private communications system, is unique in the history of telephony, and the project is attracting widespread attention throughout the Independent telephone industry.

Like Rome, the Grinnell Cooperative Telephone Co.'s modern, streamlined and up-to-date telephone system was not built in a day, although the actual construction of the lines, requiring about 179 miles of wire and hundreds of poles, was accomplished in exactly a year.

The farmers along Route 146, and areas adjacent thereto for a distance of seven miles south of Grinnell, always maintained their own lines. That is, they were supposed to maintain them, but by 1945 the system was in a pretty awful condition. Some lines had as many as 18 or 20 subscribers on them, and if you did succeed in reaching somebody in Grinnell you had to yell louder than a Diesel locomotive to make yourself heard.

About this time a group of the farm subscribers began thinking about better telephone service, and they at first decided to spend several hundred dollars to repair the existing lines. They went to officials of the Iowa Telephone & Telegraph Co., which switches the calls of farmer-owned telephones, for advice, and were counselled that the contemplated expenditure would be like pouring money down the well-known rat hole.

Then came the bare inception of an idea. Joseph L. Van Horn, general superintendent of the Iowa Telephone & Telegraph Co. and well-known Grinnellian, threw out a suggestion that the farmers junk their old equipment and proceed to construct themselves a brand new system. "How much money?" they asked. Mr. Van Horn did a little figuring, made a few doodles with his pencil, and came up with a figure of "right around $19,000." The farm committee members gasped a little, propped themselves against a desk for support and, finally regaining a semblance of consciousness, allowed as how they'd have to give the matter a little thought.



Group of Iowa telephone men hear R. J. Whitaker tell of rehabilitation of his company's lines through newspaper clippings and photos which were displayed at recent Iowa convention.

But the idea took seed with a few, and finally the Oak Grove & Blue Point Telephone Co.—that's what they called themselves at the time—held a meeting. After that they held several meetings, and finally they made the *Big Decision*, namely, to have good and adequate telephone service at any cost and devil take the hindmost.

Then things began to happen. The old mutual company was re-organized as the Grinnell Cooperative Telephone

J. L. Van Horn, general superintendent of Iowa Telephone & Telegraph Co. (left), and R. J. Whitaker, president of Grinnell Cooperative Telephone Co., during inspection trip over new lines.

Section of new line of Grinnell Cooperative Telephone Co.

Group of Iowa farmers loading poles during job of rebuilding their telephone lines.

Co. Rolla J. Whitaker was elected president, Gaylor Dempster, vice president, and William Bitcon, secretary, together with these directors: Ira Brandt, Glen Dexter, James Higdon, Willie Laymiller, Harry Morrison, William R. Price and Willard Wells.

Although prices were high and going higher, and materials were hard to get at any cost, the farmers hitched up their belts, took a deep breath, and went to work. First, there was the little matter of money. Instead of borrowing or selling stock, they decided to assess every subscriber $200 each. The response was surprisingly good, and soon new poles were going into the ground at a good clip.

But the project was not without its interruptions, some mistakes and a few headaches. The farmers, paid at the rate of 75 cents an hour, did all of the work themselves, including the stringing of the wire, although engineering and supervisory service was furnished by the Iowa Telephone & Telegraph Co., which also installed the telephone instruments in the homes. This was under the direction of Mr. Van Horn. He and President Whitaker worked together so closely that today some of the subscribers jokingly refer to their bang-up communications system as the "Whitaker-Van Horn Telephone Co."

One of the headaches came last November when a sleet storm nearly ruined the whole works. The main line poles, carrying 22 wires on two cross arms and a pair of brackets, grew restive in their freshly dug earth, and began to lean precipitously toward the highway. Someone sounded the alarm, and within an hour, some 45 or 50 farmers were feverishly at work propping up the poles. The expedient worked. Not a pole or line broke along the entire seven mile stretch, and the threatened disaster was averted.

From now on things went on apace, and last month the last line was cut over. Everybody now has a new number and a brand new, shiny black magneto (convertible) handset telephone of the latest design and efficiency. Talking is all done over metallic circuits. No line has, or will have, more than 10 subscribers on it. The total cost, incidentally, was just under the $19,000 estimate—$18,466.

Probably the most interesting thing about the project are the rates which have been established — $2.50 per month for those who "kicked in" to the construction fund, and $3.25 a month for those who didn't. Out of their receipts the subscribers, now known as the Grinnell Cooperative Telephone Co., pay the Grinnell exchange of the Iowa Telephone & Telegraph Co. a switching fee of $1.00 per month, the remainder going into a depreciation reserve and a maintenance fund. These rates, it is expected, will provide adequate depreciation and maintenance and will build up a small reserve.

The cooperative company even has a stub-billing system. Each bill has two stubs. The subscriber gets the bill, the secretary keeps one stub and sends the other to the local bank, which receipts the bill upon payment and which sends the receipted stub back to the secretary.

The farm subscribers have affiliated themselves with the Iowa Independent Telephone Association and take an active interest in its affairs.

Everybody is happy about the whole thing, and the subscribers are elated over their new service. "Poor transmission" is a thing of the past. This was demonstrated when Mr. Whitaker had occasion to telephone Lloyd F. Morrison, vice president and general manager of the Iowa Telephone & Telegraph Co. Mr. Whitaker's voice came through the receiver like a gatling gun.

"You're talking too loud, Rolla," Mr. Morrison admonished his caller.

"I didn't realize it," Mr. Whitaker replied, "but I'm glad you told me. You know, we've been yelling so loudly at each other out here for so long, I suppose it will take us a little while to get out of the habit!"

Recently Mr. Van Horn and Mr. Whitaker called on a few of the subscribers to check up on their service. To one elderly lady they said:

"How does it seem to be on a line with eight or nine people instead of 18 or 20?"

"It seems pretty good," she replied, "but the bell on our phone doesn't ring nearly as often as it used to and, do you know, sometimes during the day things seem kinda lonesome!"

★ ★ ★ ★ ★

Firemen! Spare That Car

A Jersey City housewife telephoned police headquarters recently and cried: "My car's on fire! But don't send the firemen—they would chop it up. Send the police."

OHIO COMPANY RAISES $1,200,000 LOCALLY

THE recent experience of the Northern Ohio Telephone Co., Bellevue, Ohio, in securing necessary money to finance an extensive expansion and rehabilitation of its plant from subscribers in the 51 exchanges of the company should be of interest to all Independent telephone companies which are in need of capital for refinancing and expansion of their plants.

In two offerings of 4¼ per cent preferred stock the Northern Ohio company secured $1,200,000 in permanent capital from people in its operating territory, which indicates that the public in the smaller centers still have money to invest in enterprises in which they have confidence and which will give them a fair rate of return.

TELEPHONY asked W. C. Henry, president of the Northern Ohio Telephone Co., for the details concerning his company's successful local financing program and as his statement tells the complete story we are publishing it below:

"Northern Ohio Telephone Co.'s plant investment is in the approximate amount of $6,500,000. Our capital structure has for many years been approximately one-third 3¼ per cent bonds, one-third preferred stock and one-third common capital stock. During the war years we accumulated some cash and about 18 months ago called and retired a half million dollars of 6 per cent preferred stock. Five per cent preferred stock in the amount of one million dollars was not called and retired.

"The extensive program of expansion and additions to our plant last year made it necessary for us to refund the half million dollars worth of 6 per cent preferred stock which had been called and retired, and to secure additional money for net additions. For some time it has been our feeling that Independent telephone companies have in recent years gotten too far away from local customer ownership.

"Accordingly, we decided to try offering the telephone subscribers of our company the opportunity of purchasing our preferred stock. After some consideration as to proper interest rates, we decided to issue a 4¼ per cent preferred stock to be sold at its par value of $100 per share and limited to the sale of not to exceed 20 shares to each telephone subscriber.

"In order to test out our idea we sent a letter last September to subscribers in six of our 51 exchanges, using the addressograph mailing plates used for rendering bills. On Oct. 4, and approximately 10 days after the letter had been sent out, the entire half million dollars in preferred stock had been over-subscribed, more than half of the stock subscription blanks being returned with checks attached.

"This spring in order to finance net additions made last year, we decided to issue a second half million dollars in 4¼ per cent preferred stock. We

← LEFT: Letter sent to all subscribers.

BELOW: Stock subscription blank. ↓

NORTHERN OHIO TELEPHONE COMPANY
BELLEVUE, OHIO
March 5, 1948

To Telephone Subscribers of this Company:

During the year 1947 this company expended more than $517,000 for additions to our telephone plant for poles, cable, wire, telephones, central office equipment, buildings and other property. In order to reimburse its treasury for these funds expended last year, the officers and board of directors of the Northern Ohio Telephone Co., with the approval of the Public Utilities Commission of Ohio, now propose to sell 5,000 shares of its 4¼ per cent preferred stock.

The management of this company believes that it is desirable to have a portion of its capital securities owned locally by its subscribers, rather than issuing additional bonds which would be sold to eastern institutions or companies. Accordingly, this issue of preferred stock is available only from the Northern Ohio Telephone Co. at its par value, and is not offered through an agent or underwriter. The opportunity to purchase this stock is restricted to subscribers of this company's service who reside in its exchange territory in Ohio, and is accordingly not registered with the Federal Securities & Exchange Commission. This preferred stock will be entitled to cumulative dividends at the rate of $4.25 per annum, payable quarterly on the first day of January, April, July and October in each year. The company may redeem said 4¼ per cent preferred stock on any dividend date by paying the redemption price of $105 per share.

Sale of this 4¼ per cent preferred stock will be made at its par value of $100 per share, as of Apr. 1, 1948. The stock is offered subject to prior sale, with stock subscriptions accepted in the order in which they are received at our general offices in Bellevue. Subscriptions may be submitted for any number of shares of stock desired. However, this issue of preferred stock will be allotted in an amount not to exceed 20 shares to each subscriber up to Apr. 1, 1948. After that date all shares of stock remaining, if any, will be allotted in proportion to the unfilled amount of stock subscriptions.

If you desire to purchase shares of this new issue of 4¼ per cent preferred stock, fill out and mail to this company at Bellevue, Ohio, the enclosed stock subscription blank. Northern Ohio Telephone Co., and its predecessor, The Local Telephone Co. of Bellevue, Ohio, have paid dividends on its preferred stock regularly and continuously for more than 45 years. Should you have any questions concerning this issue of 4¼ per cent preferred stock, we will be glad to answer them.

Very truly yours,
NORTHERN OHIO TELEPHONE COMPANY
(S) W. C. Henry
President and General Manager

STOCK SUBSCRIPTION
Northern Ohio Telephone Co.
Bellevue, Ohio

I hereby subscribe for_____ shares of the 4¼ per cent preferred stock of Northern Ohio Telephone Co., with dividends cumulative, payable quarterly, and callable at $105 per share. Said 4¼ per cent preferred stock will be paid for at a price of $100 per share as of Apr. 1, 1948. I understand that this stock will be allotted in amounts not exceeding 20 shares per subscriber up to Apr. 1, 1948, and thereafter all shares of stock remaining, if any, will be allotted in proportion to the unfilled amount of stock subscriptions, with all allotments of stock subject to prior sale.

Shares of stock subscribed for are to be registered in the following name:_____

Address for dividend check mailing:_____

Payment for stock subscribed for will be made by:

(a) Check Attached

(b) Stock should be mailed to me for collection through the bank designated below:

Signed_____

Date_____

realized that the interest rates had changed but were hopeful that the stock could still be sold at 4¼ per cent. A letter was sent to all telephone subscribers in the company's 51 exchanges, excepting the six towns where our subscribers had the opportunity of subscribing to the prior issue.

"On Apr. 1 of this year we also received authority to purchase The Carey Electric Telephone Co. and to issue an additional $191,400 in 4¼ per cent preferred stock, making a total of 7,000 shares of preferred stock available for sale Apr. 1. We are enclosing a copy of the form letter and stock subscription blank, which we mailed to telephone subscribers, and we are happy to advise that the entire offering of stock has been subscribed and paid for.

"The only promotional work we did was to visit all the banks in our territory and advise them in advance of the letter which we proposed to send our telephone subscribers, offering the right to subscribe for our preferred stock. We left with each bank a copy of the financial statement of the company. In this way, all of the local banks knew in advance of the stock offering when their customers received the stock letter.

"This step we are sure was most important because a number of the banks actually helped their customers complete stock subscriptions and forwarded these subscriptions to us in lots of four or five at a time. We found that these bankers appreciated the fact that they knew in advance of the offering, and we are sure it prevented them from giving adverse advice to many of their customers who undoubtedly drew money out of their savings accounts in order to purchase stock.

"In these two transactions we have sold $1,200,000 in 4¼ per cent preferred stock to our telephone subscribers. The average sale has been 17.1 shares per purchaser. We have secured $1,200,000 in permanent 4¼ per cent capital held by people in our own operating territory. The largest item of cost was the federal revenue stamps of six cents per share, the entire cost of the transaction being less than .3 of 1 per cent. Our experience in this matter indicates to us that there is still a tremendous quantity of money in the small towns seeking an adequate return. Most of this money is held in savings accounts at 1 per cent interest. This is a market which the sellers of securities in financial centers can not tap, and it is, in our opinion, an enviable manner in which to finance a locally-owned utility.

"We quite realize that the interest rate of securities purchased by insurance companies and institutional buyers exceeds 4¼ per cent. We also realize that, perhaps, an issue of several million dollars could not be disposed of by the method we have used. However, we think that, perhaps, our experience may be of advantage to some other Independent telephone company which desires to secure from their local subscribers capital in amounts up to one million dollars."

CARING FOR LEATHER USED IN POLE CLIMBING

AN INSPECTION is recommended before starting work each week by the lineman using the climbing equipment. He should examine:

Leather for cuts, cracks, enlarged eyeholes in straps or wear that might affect its strength, and for hard and dry leather.

Stitches for breaks, ragged strands and loose or rotted threads.

Hardware for breaks, cracks, fractures, loose anchorage or wear that might affect the strength of the equipment, improper action of keeper on snap hook, and length, width, thickness and sharpness of gaffs.

REPAIR OR REPLACE the defective part as soon as it is possible to do so. The equipment will serve its purpose longer and more faithfully as a result.

CLEAN AND DRESS the leather used for climbing every month to keep it soft and pliable. Do this more often if the equipment is subjected to paint stains or excessive moisture from wet weather or perspiration.

To clean leather:

(1) Wipe off surface dirt with a sponge dampened with water only.

(2) With a clean, moist sponge and a neutral soap, work up a thick, creamy lather to remove imbedded dirt and perspiration.

(3) Wipe off with a cloth.

(4) Work up a lather again with saddle soap, and rub it well into all parts of the belt or strap.

(5) Wipe off with a cloth.

To dress leather:

(1) While the leather is still damp, apply a leather dressing, working it lightly into the leather with the hands. Always clean any leather before dressing it.

(2) Let the belt or strap dry in a shady place for about 24 hours.

(3) Rub vigorously with a soft cloth to remove any excess oil. Use only a *limited* amount of leather dressing prepared from an *animal* or *vegetable* source. *Never* use any type of mineral oil or grease. *Never* store or dry wet leather near a source of heat such as an open fire, stoves, hot steam pipes, or radiators. Artificial heat will cook or burn leather, making it hard, brittle and weak. Store body belts and safety straps away from sharp-edged tools.—*Reprinted through courtesy of ELECTRICAL WORLD*

V V

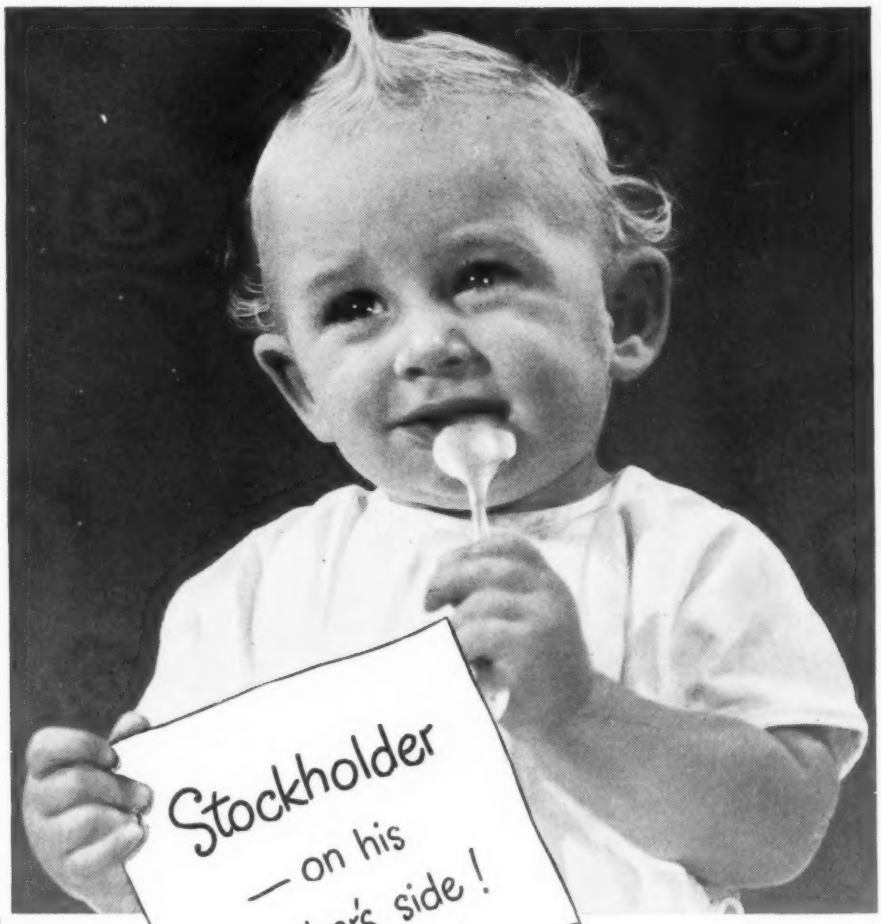
Bell System Gains 735,000 Telephones in First Quarter

The Bell System companies added more than 735,000 telephones in the first three months of 1948—an average of about 11,000 each working day—bringing the total number of Bell telephones in service to 29,240,000. The daily volume of calls handled by the system increased to 170,000,000, which is 16,000,000 more calls a day than a year ago, LeRoy A. Wilson, president of the American Telephone & Telegraph Co., stated in a quarterly report to stockholders.

New demand for telephone service continues at a high level and despite the gain in the first three months there are still about 1,475,000 persons waiting for service, Mr. Wilson said.

"Increases in telephone rates amounting to about $130,000,000 a year, made necessary by higher costs, have now been approved or made effective in 34 states and the District of Columbia. Applications for increases totaling an additional $51,000,000 a year are pending before regulatory authorities in some of these and in eight other states. Other applications will be made in the near future.

"The Bell System must meet the heavy demands for service. It can do so only by continuing to obtain additional large amounts of new capital to build the new plant that is required. In carrying out this program it is essential that the rate of earnings be such as to provide a return to the stockholders which will protect their existing investment and attract the new capital needed to provide the service that the public wants," Mr. Wilson stated.



THIS cute little fellow wasn't born with a silver spoon in his mouth but his mother is a stockholder just the same.

For she's one of the thousands and thousands of mothers — young and old — among the 390,000 women who are stockholders of the American Telephone and Telegraph Company. They outnumber the men!

They are women in all walks of life. The majority give their occupation as "housewife." Many others are teachers, nurses, stenographers, clerks and sales people.

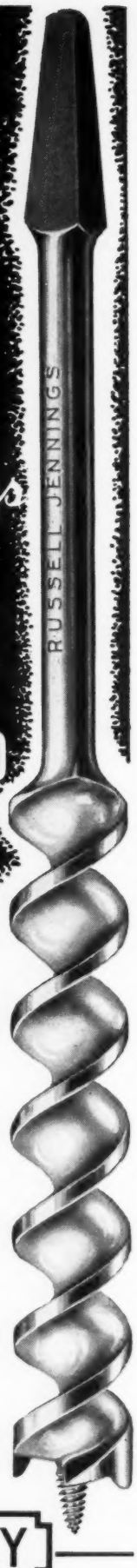
Tens of thousands of girls and women who work for the Telephone Companies either own A. T. & T. stock or are buying it out of wages.

No other stock is so widely held by so many people all over America—and there are more stockholders now than ever before. The total exceeds 723,000.

So you can see that this is a business that is owned by the people. It was built by the savings of the many, rather than the wealth of the few.

BELL TELEPHONE SYSTEM

BORE MORE HOLES with Russell Jennings ® auger bits THEY DO THE HARD WORK



Clean-threaded, properly tapered screw draws bit rapidly into the wood. No pushing! Hand-sharpened extension lips bite hard and clean. Micrometer-measured spurs "track" each other to speed the boring. Full throat takes away the chips and the correct body taper prevents binding. Russell Jennings Bits make the most of every turn of the brace. Sharper longer ... because they're made of Russell Jennings special analysis tool steel, electric furnace tempered. Buy auger bits with the name, "RUSSELL JENNINGS" stamped on the shank. They spend more time boring: take less time for sharpening.

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COURTS and COMMISSIONS

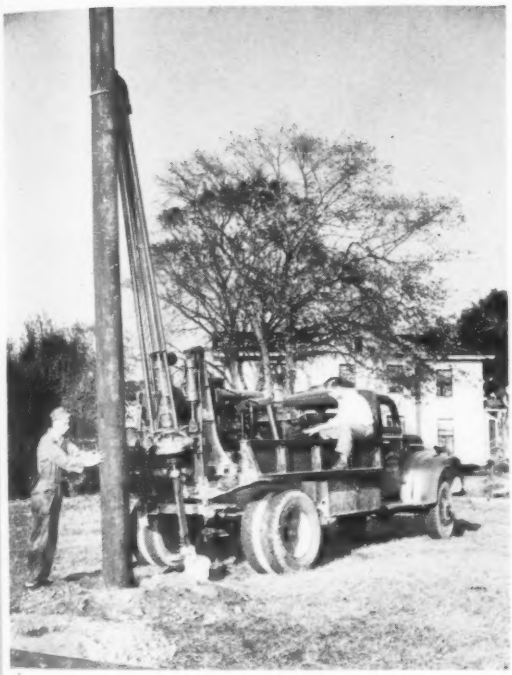
Six Illinois Independents Allowed Higher Rates

The Illinois Commerce Commission has authorized the Assumption Mutual Telephone Co., Raritan (Ill.) Switchboard & Telephone Co., Suburban Telephone Co., Dunlap, Thomas (Ill.) Telephone Co., Watson-Gilmore Rural Telephone Co., Altamont, and the Western Illinois Telephone Co., Aledo, to advance their telephone rates as follows:

Class of Service	*No. of Stations*	*Net Annual Rates Present*	*Proposed*	*Authorized*
Assumption Mutual Telephone Co.				
Business				
Individual	49	$36.00	$48.00	$48.00
Two-party	26	30.00	39.00	39.00
Extension	18	9.00	12.00	12.00
Residence				
Individual	83	$24.00	$30.00	$30.00
Two-party	20	21.00	27.00	27.00
Four-party	221	18.00	24.00	24.00
Extension	17	6.00	6.00	6.00
Rural multi-party				
Business	3	$24.00	$33.00	$33.00
Residence	183	18.00	27.00	27.00
Service stations	31	5.00	12.00	12.00
Raritan Switchboard & Telephone Co.				
Individual business	12	$14.00	$20.00	$20.00
Individual residence	17	12.00	18.00	18.00
Rural multi-party	115	10.00	15.00	15.00
Suburban Telephone Co.				
Business				
Individual	24	$36.00	$42.00	$42.00
Two-party	..	....	36.00	36.00
Rural multi (magneto)	6	30.00	39.00	39.00
Residence				
Individual	108	$27.00	$33.00	$33.00
Two-party	19	24.00	30.00	30.00
Rural multi (magneto)	202	24.00	27.00	27.00
Rural six-party (C.B.)	38	27.00	39.00	39.00
Rural eight-party (C.B.)	27	27.00	33.00	33.00
Rural multi-party (C.B.)	..	....	30.00	30.00
Thomas Telephone Co.				
All classes of service	164	$16.00	$21.00	$21.00
Watson-Gilmore Rural Telephone Co.				
All classes of service	200	$12.00	$18.00	$18.00
Western Illinois Telephone Co. at Joy				
Business				
Individual	47	$18.00	$39.00	$39.00
Two-party	..	....	33.00	33.00
Extension	7	12.00	12.00	12.00
Residence				
Individual	67	$14.40	$30.00	$30.00
Two-party	..	....	27.00	27.00
Four-party	67	12.00	24.00	24.00
Extension	..	....	9.00	9.00
Rural				
Multi-party, business	..	....	$36.00	$36.00
**Multi-party, residence	169	$14.40	24.00	24.00
Switching service	12	12.00	9.00	9.00

**Grounded service 25 cents per month less where available.

JAQUES EARTH BORING MACHINE



Pole Setter operating with Jaques Hydraulic Control Earth Boring Machine showing 35 ft. poles being raised into position. Cost $172.50 extra when purchased for mounting with machine.

The following is a partial list of companies who have purchased Jaques Hydraulic Control Earth Boring Machines:

Philadelphia Electric Co.,
Mr. Lloyd D. Edsall
24th and Market Street,
Philadelphia, Pa.

Rockland Light & Power Co.,
Middletown, New York
Mr. Clemens

Buffalo-Niagara Electric Corp.,
93 Dewey Ave.,
Buffalo, New York
Mr. Shephard—Mr. Baumgartner

Duquesne Light Company,
Pittsburgh, Pa.
Mr. Witt—Mr. Wenz

Utilities Line Const. Co.,
Jenkintown, Pa.
Mr. Vogan—
(Mr. Roberts, Wayne, Mich.)

Hydro Electric Power Commission of Ontario, (4 machines)
1379 Bloor St., West,
Toronto, Canada.
Mr. Clark—Mr. Leighton

New York Electric & Gas Corp., (3 machines)
Binghamton, New York
Mr. Nichol

Sordoni Construction Co.,
45 Owen Street,
Forty Fort, Pa.
Mr. Roan, V.P.
Mr. J. Gunning, Supt. of Equip.

Pennsylvania Power & Light Co.,
Hazleton, Pa.
Mr. Kilgo

Staten Island Edison Co.,
Staten Island, N. Y.—Mr. Woelfle

Iowa-Illinois Gas & Electric Co.,
Davenport, Ia.—Mr. Edw. F. Miller

Jamestown Telephone Company,
Jamestown, New York—Mr. Fuller

Leesport Telephone Company,
Leesport, Pennsylvania

H. D. Blattenberger,
Cambridge Springs, Pa.

Jud Sedwick,
Kittanning, Pa.

Fred Wagner,
Newfoundland, Pa.

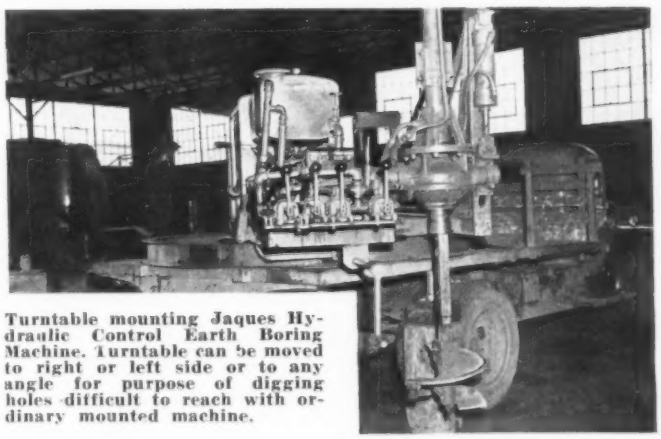
Vare Bros.,
Ardmore, Pa.

Willard Ives,
Troy, N. Y.

SERVICE FACILITIES

A complete stock of new Jaques Hydraulic Control Earth Boring Machines is carried in our warehouse at all times. All wheel drive trucks are available for immediate delivery. A complete stock of augers, cutting edges, cutting shoes and Jaques Parts is available. Because the machine is 75% Ford, you have no service Problems as the motor, transmission and final drive are genuine Ford parts. When a machine is sold, service personnel will assist in the installation of the unit and teach your operators how to handle the machine in all types of digging, and give instructions to your maintenance department.

You may rest assured that Hydraulic Control Earth Boring Machines are good and will do a better job at less cost per hole. **We are prepared to prove our claims and will be more than pleased to demonstrate to anyone interested in this type of equipment.** You may also contact any of the owners listed above for the purpose of checking on the equipment, the company back of it and the service program.



Turntable mounting Jaques Hydraulic Control Earth Boring Machine. Turntable can be moved to right or left side or to any angle for purpose of digging holes difficult to reach with ordinary mounted machine.

Hydraulic Ram mounting Jaques Earth Boring Machine allows digger to be moved to right or left, making it easy to locate auger over stake where the pole is to be placed.

This Company is the distributor for the Jaques Hydraulic Control Earth Boring Machine and Jaques Equipment in the states of Minnesota, Wisconsin, Iowa, Illinois, Indiana, Ohio, Kentucky, Pennsylvania, New York, Maryland, Delaware, New Jersey, Michigan, Virginia and all of New England States and export to all countries except Mexico and Australia.

Wyoming Valley Equipment Co.

INCORPORATED

DISTRIBUTORS AND EXPORTERS OF

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Increase Denied, Oklahoma Company Files Exceptions

Exceptions to the Oklahoma Corporation Commission examiner's recommendation that it be denied increased switching rates were recently filed by the Lookeba (Okla.) Telephone Co. (TELEPHONY, Mar. 27, p. 22). Hearing is set for July 20.

The company is requesting an increase from 50 cents to $1.00 in monthly rural switching charges and alleges that at the examiner's hearing testimony showed that it was losing money on the lower rate.

V V

Two Missouri Independents Seek Rate Increases

The Bolivar (Mo.) Telephone Co. on Apr. 7 asked the Missouri Public Service Commission to authorize rate increases totaling $9,277 a year.

Officials said the company last year operated at a $3,000 loss, exclusive of depreciation and without return on the property to the owners.

The New London (Mo.) Telephone Co. also petitioned for increased rates to yield an additional $2,362 in revenues annually.

V V

Pennsylvania Company Files For Higher Rates

The Big Eddy Telephone Co., which serves 910 subscribers, operating exchanges at Beachlake and Galilee, Pa., and at Narrowsburg, N. Y., has filed a new tariff with the commission in both states, effective June 1.

The new rates for the Pennsylvania exchanges, which will produce an estimated annual revenue of $6,960, follow:

	Present rate	*New rate*
One-party, business....	$1.92	$3.50
Multi-party, business...	1.50	2.50
One-party, residence....	1.92	2.50
Multi-party, residence..	1.50	2.00

V V

Orders Filing of Rate Sheets

The Michigan Public Service Commission has ordered the Watson Telephone Co. to file a rate sheet conforming substantially to those rates proposed in its petition requesting authority to establish regulations for foreign exchange service.

V V

SW Bell Rate Hearings End

Hearing on the temporary rate increase application of the Southwestern Bell Telephone Co. in Oklahoma ended Apr. 13 following an announcement by the Oklahoma Corporation Commission that it would rule on the petition as soon as possible. This brings to an end the series of hearings which began Jan. 20 (TELEPHONY, Jan. 31, p. 23).

V V

California Commission Rules Against "Bookie" Service

Discontinuance of telephone and telegraph service to horse racing wire operators, effective Apr. 26, was ordered on Apr. 7 by the California Public Utilities Commission.

The commission was the second state agency to strike against California's flourishing bookmaking business, which Governor Earl Warren's crime commission has called the chief cause of "gangsterism."

State Attorney General Fred N. Howser, in an earlier separate action, ordered communication companies to suspend service to racing wires furnishing nationwide racetrack results to California bookies.

"It must be concluded," the commission said, "that the state, having the authority to compel a utility to render service, has the authority to impose conditions under which such service must be furnished or terminated."

The commission's order directs telephone and telegraph companies to refuse service to any subscriber whenever there is "reasonable cause to believe" the service will be used illegally.

V V

Would Give Administrator Year To Decide Utility Rate Cases

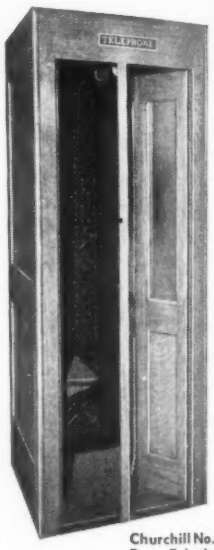
A proposal by Gov. John O. Pastore of Rhode Island to give the state public utility administrator a year in which to render a decision in rate cases has been passed by the state House of Representatives. In the Senate, however, another bill has been introduced which would provide that if the administrator's decision is appealed to the State Public Utility Hearing Board, rates approved by the administrator would be effective pending the board's decision.

As the Senate bill contains no retroactive provision it is unlikely that it will apply, if passed, in the New England Telephone & Telegraph Co. rate case. The company is appealing the decision of the Administrator (TELEPHONY, Apr. 17, p. 26).

V V

Schedule May Rate Hearings

Hearings on the rate petitions of the Albany (Minn.) Telephone Co. and the People's Independent Telephone Co., Winthrop, have been scheduled for May 3 and 6, respectively, by the Minnesota Railroad & Warehouse Commission.

STROMBER


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and private—the CHURCHILL
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increase your pay station business
Operating companies have found
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equipped with a reinforced back p
for mounting a wall telephone or
collector.
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Included as standard equipment
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ventilator.
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depth, 30½". Shipped knocked d
and crated.
Illustrated literature available.
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dependable service . . . **long life**

Provides constant, humless Direct Current supply to operator's circuit on magneto switchboards. Operates direct from lighting circuit. Incorporated in the PA-05004 is a Power-Off Relay. This relay is continuously energized from the AC line. In case of AC power failure, the operator's circuit is automatically transferred to stand-by dry cells with no interruption in service.

The Electrox PA-05004 Battery Eliminator consists of a transformer; rectifying elements rated for continuous service that require no attention or periodic replacement; ample choke and condenser filtering system; power-off relay, and rubber-covered AC attachment cord and plug, compactly mounted in a well-ventilated steel cabinet arranged for wall mounting. Cabinet is attractively finished in black wrinkle and measures only 4″ x 4″ x 6½″.

Electrox Battery Eliminator PA-05004
Mfd. by Rectifier Division of The Schauer Machine Co., Cincinnati.

cook type 0 *sub-station protector*

This single circuit protector, equipped with fuses and lightning arresters, is unexcellent for either indoor or outdoor use. Special Cook-engineered features include:

1. Heavy white glazed porcelain designed to prevent surface leakage between current-carrying parts.
2. Tru-Gap high-potential dischargers that will not ground the line.
3. Phosphor bronze fuse and arrester springs, zinc hood, Everdur studs and washers. Hood is grounded when in place.
4. Choice of types and lengths of Cook Telephone Fuses.

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Consists of a wrought-iron cylinder with a steel anvil at the base and a steel driving rod. The anvil can be securely fastened to ground rods up to ¾ inch in diameter, and the driving rod is raised and lowered by the operator to deliver hammer-like blows to the rod without danger of injury to the operator. Total weight of the tool is 14 pounds.

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Two Oregon Companies Granted Rate Increases

Rate increases were recently granted by the Public Utilities Commissioner of Oregon to the Scio (Ore.) Mutual Telephone Association and the Coast Telephone Co., serving Alsea, Kings Valley, Philomath, South Beach, Waldport, and Yachats.

The Scio company received a $2.00 raise for city and farm service, effective May 1.

In its application the Coast Telephone Co. stated that: It had suffered an operating loss of $610.11 for a five month period, ending Feb. 29, 1948; its lines require a great deal of deferred maintenance in order to render proper communication service to the public; since taking over the operation of the system in late 1947, it had increased wages and the number of operators on duty; the local exchange circuits are overloaded and that it plans to build additional lines in order to relieve the congestion and render better service; it will furnish unlimited 24-hour service in the Philomath and Waldport exchanges; the proposed rates would increase its annual revenue to $8,964.

The commissioner ruled that the rate request be approved and that the Coast company's new exchanges in Alsea, Kings Valley, South Beach, and Yachats be opened as soon as equipment and materials are obtainable.

V V

Three Minnesota Independents Receive Rate Increases

Three Independents were recently granted rate increases by the Minnesota Railroad & Warehouse Commission. They are: The Minnesota Telephone Co., Minneapolis, serving approximately 525 local and 18 rural stations and switching for 267 stations in Elbow Lake and Herman; the Wykoff (Minn.) Cooperative Rural Telephone Co., switching for 100 local and 190 rural stations; the Farmers & Merchants Telephone Co., Lanesboro, serving approximately 366 local and 231 service stations.

The following rates will become effective for the three companies on the first billing date after Apr. 30.

The Minnesota Telephone Co.:

Elbow Lake Exchange

Class of Service	*Present Monthly Net Rates*	*Approved Monthly Net Rates*
Individual line, business	$3.00	$3.75
Two-party line, business	2.50	3.25
Individual line, residence	1.50	2.50
Two-party line, residence	1.25	2.25
Four-party line, residence	—	2.00
Rural multi-party	1.75	2.00

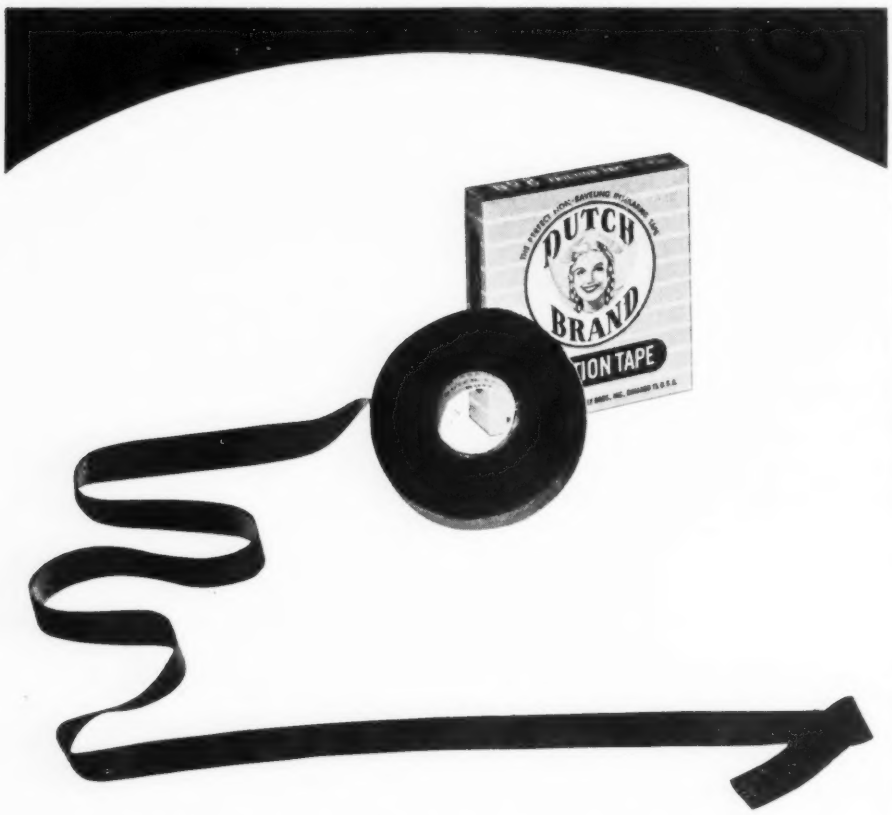
Herman Exchange

Class of Service	*Present Monthly Net Rates*	*Approved Monthly Net Rates*
Individual line, business	$2.75	$3.25
Two-party line, business	2.25	2.75
Individual line, residence	1.25	2.25
Two-party line, residence	1.00	2.00
Four-party line, residence	—	1.75
Rural multi-party	—	2.00

The Wykoff Cooperative Rural Telephone Co.:

Class of Service	*Present Gross Annual Rates*	*Approved Gr An Ra*
Individual line, business	$11.00(a)	$15
Individual line, residence	7.00(a)	10.
Two-party line, residence	6.50(a)	8
Four-party line, residence	6.25(a)	7.
Rural multi-party line ...	6.00(a)	7

(a) A discount of $1.00 is allo[illegible] if



Here's why Dutch Brand friction tape doesn't ravel

• First of all, Dutch Brand tape is made from special long warp cotton sheeting that is resistant to raveling. Then it is wound by a process that eliminates the tight spots in the roll which usually cause tape to ravel. Every roll of this better friction tape is the same, is easier to use, helps do a better job quicker. It sticks tight, provides good insulation. Dutch Brand tape is available from Leich in full 68 foot rolls. ¾" wide. Order your tape and other needs from Leich. Today.

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EVERYTHING FOR THE TELEPHONE INDUSTRY

payment is made on or before Aug. 1 for the entire calendar year.

The Farmers & Merchants Telephone Co.:

Class of Service	*Present Gross Rates*	*Approved Net Rates*
Individual line, business	$3.25 (a)	$3.50
Individual line, residence	1.85 (a)	2.00
Two-party line, residence	1.65 (a)	1.75
Four-party line, residence	—	1.75
Rural multi-party, switching charge	4.60 yr. (b)	5.00 yr.

(a) Discount of 25 cents per month is allowed if paid on or before the 15th day of the month for which service is rendered.

(b) Discount of 60 cents per year is allowed if paid on or before the last day of the month in which bill is rendered.

Included in the companies' financial statements to the commission were the following:

	Minnesota Company	Wykoff Company	Farmers & Merchants Company
Total revenues	$26,830	$4,000	$14,337
Total expenses	22,886	3,839	12,621
Net income	3,944	161	1,716
Rate base value	66,000	3,180	36,238
Ratio net income to above	5.99%	5.06%	4.7%

V V

Three Nebraska Companies Given Rate Increases

Authority to increase rates was given to three Independent telephone companies by the Nebraska State Railway Commission recently. The Farmers Mutual Telephone Co., Avoca, was authorized to increase net rates as of May 1, by 40 cents a month on each class of service. Sixteen business subscribers will pay $1.65 a month, forty-eight residence subscribers, $1.25, and 101 rural subscribers, $1.00.

The commission finds that the authorized schedule will increase revenues from $2,597 a year to $3,375. However, information furnished by the company's president, Calvin F. Carsten, and its secretary, George C. Meyer, showed that expenses will be increased for the current year from $3,511, in- cu in 1947, to $4,227.

Chapman (Neb.) Telephone As- n has been granted permission ease single party rates on 88 from $1.75 to $2.25 a month n 182 rural party subscribers 1.75 to $2.25, on a net basis. the new schedule the company ve revenues of $8,596 and ex- pe of $7,403.

A... ...crease of 75 cents a month on

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.091 aluminum alloy spinning wire. Very high corrosive resisting —used with steel strand.

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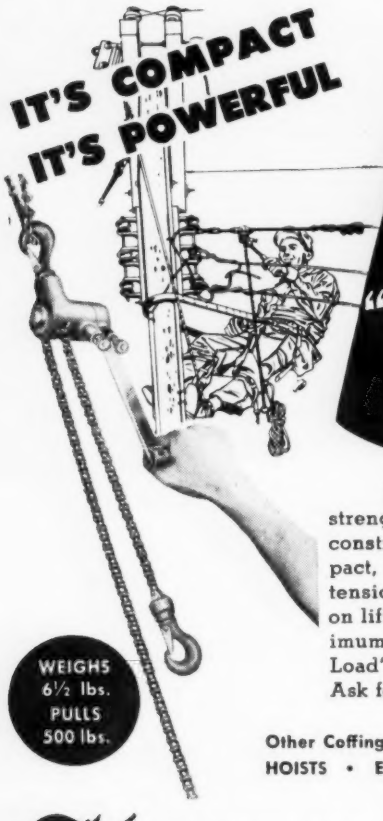

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JENKINS Gold Seal Tapes
FRICTION...RUBBER

all types of service was granted to the Garfield Mutual Telephone Association, Burwell. Under the new schedules, effective May 1, the association is authorized to charge gross rates of $2.25 on business wall, $2.50 on business desk, $2.00 on residence wall, $2.25 on residence desk, $2.25 on rural wall and $2.50 on rural desk. The new rates apply to 66 business, 120 residence and 237 rural stations.

Total revenues for 1947 were $6,894 and expenses $4,462. Under the new schedule it is estimated that annual revenues will be $10,700 and expenses $6,564, leaving an operating net income of $4,136. Consent to the increases was contained in a petition signed by more than three-fourths of the subscribers.

The Odell (Neb.) Telephone Co. also was authorized by the commission to discontinue flat rate service between Odell and Wymore and free service to Steele City through the Diller exchange. The commission found that recent changes in service supplied by the Lincoln Telephone & Telegraph Co. in that area would result in payment by the Odell company of rental charges for service furnished at a loss, and that the application was for a lawful object. No objections were filed by subscribers involved.

The commission also has received a petition from the Arapahoe (Neb.) Telephone Co., which serves in excess of 300 town and rural stations, requesting authority to establish a differential rate of 50 cents a month on handset telephones.

V V

To Test Constitutionality of N. J. Utility Anti-Strike Law

The New Jersey state CIO council was granted permission Apr. 12 by Vice Chancellor John O. Bigelow to file a brief in a case testing the constitutionality of the state's 1947 law outlawing strikes in public utilities (TELEPHONY, May 10, 1947, p. 32).

The case was scheduled to be heard before Chancellor Bigelow Apr. 21 and 22, on motion by Israel B. Greene, counsel to New Jersey Traffic Division 55, Communication Workers of America, an independent union.

The CIO council asked permission to aid the court by placing further facts before it for consideration, and said its being permitted to do so would avoid multiplicity of suits concerning the anti-strike law. The council listed a number of unions it represents in various utilities.

State Attorney General W. D. Van Riper, who instituted the suit to head off the telephone operators' attempt to

test constitutionality of the act in federal court, will file briefs, as will Mr. Greene and counsel for the New Jersey Bell Telephone Co.

The litigation grew from the national telephone strike last year. The operators challenge the constitutionality of the act, under which their union was fined $10,000 for continuing on strike after the telephone company was taken over for operation by the state.

Mr. Greene carried the operators' federal court suit to the U. S. Supreme Court, but it decided that the law should be tested first in the state courts (TELEPHONY, Dec. 27, 1947, p. 28).

V V

Eastern Illinois Rate Case Set for May 4

The Illinois Commerce Commission will hold a hearing May 4 on the application of the Eastern Illinois Telephone Co., Rantoul, to revise rates in its nine exchanges.

Communities involved are Rantoul, Gifford, Penfield, Fisher, Thomasboro, Foosland, Potomac, Armstrong and Collison.

V V

Rhode Island Bell Rates Not Subject to "Stay"

Rhode Island telephone rates, based on the recent order of the state public utilities administrator, are likely to become established pending a decision of the Public Utilities Appeal Board on the effort of the New England Telephone & Telegraph Co. to obtain a 23 per cent rate raise. A 10.5 per cent rise was set by Administrator Thomas A. Kennelly on Mar. 31.

Attorney General John H. Nolan has ruled that when the legislature established the appeal board, it was intentionally silent on the matter of rates being stayed on account of appeal to the latter body. He pointed out that when the legislature intended that an appeal should stay a decision, as in the case of appeals from the state liquor administrator to the Liquor Appeal Board, this was clearly set forth in the language of the law. In that case the administrator's ruling would be held in abeyance pending decision by the appeal tribunal.

The telephone company's newly filed rate schedule is expected to yield but $1,200,000 compared with $2,700,000 sought.

Administrator Kennelly turned over the 10.25 per cent tariff to Cyrus G. Hill, rate expert for the state in the recent hearings, who reviewed it and reported that in his opinion it represents a fair and reasonable distribution between the different classes of

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Think of the time, labor and inconvenience this saves! Eliminates extensive ditching as just a short trench accommodates the pusher . . . no tearing up of pavement, lawns, floors . . . eliminates back-filling, tamping, tunneling, repaving. Cuts job time to a fraction!

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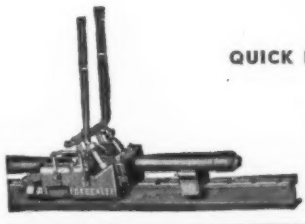

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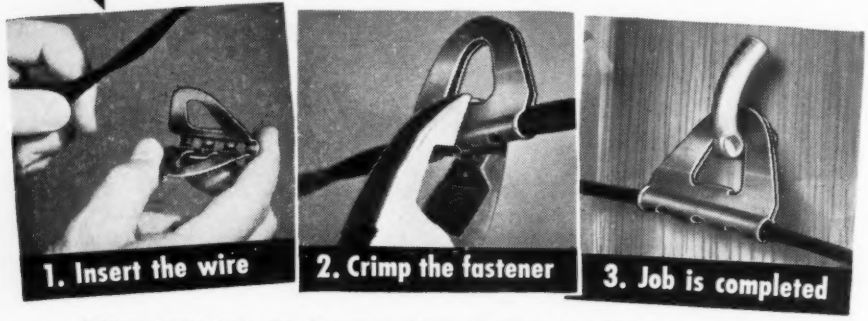
Speed Up Drop Wire Installations with Kearney Drop Wire Clips

Installation is simple and fast — using only a pair of ordinary pliers.



When installed, the Kearney Drop Wire Clip will stay in place. The wire is completely enclosed so that it cannot fall from the clip. It avoids spot loading, too, because it grips the wire over the entire length of the clip.

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service of the burden of increased rates and charges. (TELEPHONY, Apr. 17, p. 26.)

V V

Show Cause Order Issued To Southern T&T in Georgia

Southern Bell Telephone & Telegraph Co. was cited Apr. 16 by the Georgia Public Service Commission to show cause May 10 why its rates should not be revised. (TELEPHONY, Apr. 17, p. 25.)

At the same time the Fulton Superior Court was notified that the commission will not appear further in the injunction case now pending.

Chairman Walter McDonald said that the previous order of the commission fixed only temporary rates and the new citation is for fixing permanent rates, making it a different case entirely.

Chairman McDonald pointed out that the court order did not enjoin the commission from pursuing its investigation of telephone rates, which it is doing.

V V

Minnesota Rate Hearing May 3

The Minnesota Railroad & Warehouse Commission has set May 3 for a hearing on the rate increase application of the Hoffman (Minn.) Telephone Co.

V V

Summary of Commission Rulings and Hearings

Illinois Commerce Commission

Apr. 20: Hearing on complaint of Middle States Telephone Co. of Illinois, Park Ridge, regarding change in service between exchanges at Pekin without company consent.

Apr. 20: Hearing on application of Minonk (Ill.) Telephone Co. for increased rates.

Apr. 21: Hearing on application of Illinois Bell Telephone Co., for authority to purchase from the Western Union Telegraph Co. certain telephone plant in Bloom, Thornton, and Bremen Townships, and in Cook and Will Counties.

Kansas Corporation Commission

Apr. 26: Hearing on application of Blue Mound (Kan.) Central Mutual Telephone Co. for authority to change rates.

May 3: Hearings on applications of Little River (Kan.) Telephone Co., Brookville (Kan.) Telephone Co. and Northern Kansas Telephone Co., Effingham, for authority to change rates.

New York Public Service Commission

Apr. 23: Hearing on application of Upstate Telephone Corp. of New York, Johnstown, to issue certain promissory notes.

Oklahoma Corporation Commission

Apr. 27 and 30 and May 7, 14, 18 and 28: Application of Southwestern Bell Telephone Co., for increased intrastate rates in its 146 exchanges.

Apr. 28: Hearing on application of H. C. Popjoy et al for service from the Southwestern Bell Telephone Co., in an area northeast of Britton now claimed by the Spencer (Okla.) Telephone Co.

May 6: Commission investigation of why 44 sections of Stilwell (Okla.) Telephone Co. territory have not been declared open.

June 16: Continued hearing on application of Southwestern Bell Telephone Co., Southwestern Associated Telephone Co., Lubbock, Tex., Southwestern States Telephone Co. of Brownwood, Tex., and Oklahoma Telephone Co., Broken Arrow, for continuance of rules, similar to those of expired federal regulation U-2 governing order of service installation.

June 22: Continued hearing on application of the residents of Moore, requesting that the Southwestern States Telephone Co. of Brownwood, Tex., be required to give adequate service.

July 30: Hearing on application of Lookeba (Okla.) Telephone Co. for exceptions to commission examiner's recommendation for denial of increased switching rates.

Sept. 7: Hearing on application of Wayne residents for automatic dial exchange installation by the Southwestern States Telephone Co., Brownwood, Tex.

Pennsylvania Public Utility Commission

Apr. 22 and 23: Commission investigation of rates, charges and service of Bell Telephone Co. of Pennsylvania in the exchange areas of the Pittsburgh district.

Wisconsin Public Service Commission

Apr. 20: Hearing on application of Wisconsin Telephone Co. for increased rates.

Apr. 23: Hearing on application of Farmers Toll Line Telephone Co., Lancaster, for increased rates.

Apr. 29: Commission investigation of telephone service needed by Harry M. Gullikson, Iola, and of practices and activities of Amherst (Wis.) Telephone Co.

May 5: Hearings on applications of Wisconsin Telephone Co. to purchase Freedom Mutual Telephone Co., Little Chute; Apple Creek Farmers Telephone Co., Appleton, and Twelve Corners & Mackville Telephone Co.; and to discontinue the free inter-exchange service of the Twelve Corners & Mackville Telephone Co. between Appleton and Black Creek.

May 6: Hearing on application of Commonwealth Telephone Co., Madison, for increased rates.

May 14: Hearing on application of Beef River Valley Telephone Co., Osseo, for increased rates.

V V

U.S., Canada Conclude Communications Pact

The governments of Canada and the United States announced recently that an agreement has been concluded concerning the future operation of certain of the telephone and telegraph lines constructed during the war between Edmonton, Alberta, Canada, and the Alaskan-Canadian border.

These lines provide direct communi-

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cation between Canada, the United States and the interior of Alaska. They are available for transmission of telephone and telegraph messages of private industry and individuals and are handling a steadily increasing volume of commercial traffic. They were built during the war under technical supervision of the United States Army Signal Corps and at the conclusion of hostilities sold to and are now operated by the Canadian government.

These facilities parallel the highway from Edmonton, Alberta, to the Alaskan-Canadian border, which is approximately 1,700 miles from Edmonton. At the boundary the Canadian portion of the lines connects with the Alaska Communication System which provides telephone and telegraph service for the territory of Alaska.

Under the present agreement the Canadian government makes available certain channels on the lines within its boundaries for use by the United States on a retail basis. These several telephone and teletype channels are leased in accordance with standard commercial rates. The United States government agrees to maintain the facilities in Alaska, operation and maintenance of the facilities in Canada being the responsibility of the Canadian authorities. In both cases, maintenance is to be carried out in accordance with standard practices.

The agreement is to remain in force until the two countries mutually consent to terminate it after one year's notice by either government.

A rarity among musical organizations is the Tel-Co choir of Butler, Pa. composed of 30 employes of the People's Telephone Corp. Considered one of the outstanding vocal groups in the Tri-State district, the choir is directed by Roy Cleeland, well-known Butler musician and arranger. Recent public appearances include a Chicora (Pa.) Rotary Club program and the Easter sunrise service at the First United Presbyterian Church in Butler. Members are, front row, left to right: RACHEL HILGAR, VIVIAN BROOKS, SHIRLEY CAMPBELL, ROSE KAIBE, VIRGINIA STAIGER, JANE SCHMOKER, EVELYN SHIRA, MARTHA NEAL, and MARY J. SCHAMING. Second row, left to right, WILLIAM CROSS, DOLORES WALKER, CLARA LOU GATES, accompanist, ROMAINE MacDONALD, NORMA JEAN COOPER, CHARLINE REA, accompanist, JANE BERNLOHR, and CHESTER NEBEL. Back row, left to right, ROY CLEELAND, director, GLENN CRATTY, WAYNE ALLEN, JAMES MARTIN, RICHARD ZEITLER, ROBERT MILLER, and WILLIS BLACK.

The estimated consumption of rubber in the United States for the present year will be about 870,000 tons, which is more than 30 per cent above the top prewar level of 648,500 tons in 1940.

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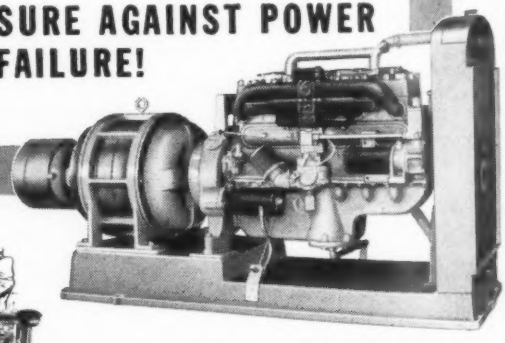
INSURE AGAINST POWER FAILURE!



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Laying Out New Pole Lines

(Continued from page 20)

will then be set in line and at regular intervals until a loading section is laid off and a stake will then be set at the load splice. Measurement of the next load section will then start from this point. If a line stake is mismarked, a 200-ft. error in length of load section will result. Such a deviation in load spacing could not be tolerated and costly corrective measures would be required. If, through observance of cable reel lengths and the number laid, the error is found during construction, all splice and load locations staked subsequently to the error and before it is found will have to be relocated.

When quadded cable is being installed, all splice locations must be staked and adequately marked to indicate the type of splice to be made, such as random, semi-final, etc. In order to avoid some embarrassing mistakes, it is a good policy to check all cable layout measurements prior to and well in advance of laying the cable, by remeasuring all load sections. This can be easily and quickly done since all line stakes are in and alignment of the check measuring is not necessary. However, in order to avoid making the same error twice, it is suggested that the second or check measurements be entirely independent from the staking measurements. In other words, don't start at the beginning and just check stake-to-stake distances; start at the last loading point established and chain in reverse direction of the line.

Another point to remember, in staking out both cable and pole lines, is that the measurements should be made on the basis of conductor lengths after installation. In the case of open wire or aerial cable lines, ground surface distances are incorrect since any humps in the ground, steep banks, or other sharp changes in ground surface will be taken out by grading the pole line. Accordingly, in measuring for pole lines, the steel tape should be pulled and supported to assume the position of the conductors after they are installed. In buried cable lines, the conductor lengths will be approximated by the ground surface distances and measurements should be made accordingly. The tape should not be stretched out across gullies or creeks. Special care is recommended in making all buried cable line measurements.

In staking a pole line, the line lo-

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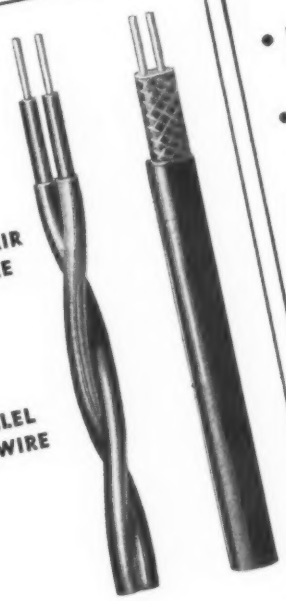

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OUTSIDE WIRES—Drop, bridle and tree—sizes 14 to 22—B&S, bronze, copperweld, copper and iron conductors, rubber insulated, cotton braided.

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cator will usually find it necessary, for various reasons, to deviate from the selected pole spacing. For example, pole locations should take advantage of ground contours, and spans will be increased or decreased in length to allow the pole to be set on high points of ground rather than in the hollows. This will give added clearance to the line and may, at the same time, provide more favorable soil conditions for digging holes, and a firmer support for the poles. Deviations in span lengths are required occasionally at stream crossings; again, the acquisition of right-of-way agreements may dictate the pole location.

However, in locating poles with shorter or longer spans than normal, it is important that the transposition spacing be maintained as accurately as practicable. The following rules apply in this connection:

First, the maximum deviation between the normal average transposition spacing and the actual spacing should not exceed 100 ft. For instance, if the average transposition spacing is 600 ft., then the spacing between any two successive transpositions should not be less than 500 ft. or more than 700 ft.

Second, only a small percentage, say 5 per cent, of the deviations should be near this value.

Third, the average deviation from the normal transposition spacing for the entire line, or repeater section, should not exceed 35 ft. It is essential that these rules be observed in order to provide an effective transposition scheme.

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PRECISE CONTROL
OF
VOLTAGE LIMITS

RAYTHEON
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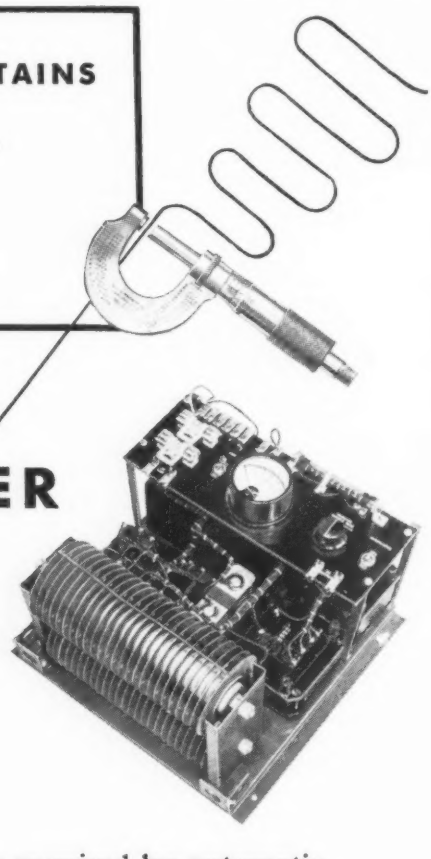

The close voltage limits required by automatic telephone systems are maintained by the Raytheon RECTICHARGER because it has no moving parts — nothing to wear out or get out of order — it needs no maintenance. And the RECTICHARGER'S constant potential method of charging prolongs battery life . . . makes fewer renewals necessary.

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Cable Splicing

(Concluded from page 24)

to avoid injury to the paper, especially where the ring is cut around the sheath. Clear four inches of the sheath adjacent to the opening on old cable with a shave hook. On new cable, use wire brush or steel wool. Then coat the cleaned surface thoroughly with a coat of stearine and unless the entire splice is to be completed in one operation, wrap the coated portion with muslin to protect it until ready for wiping. Second operation, bend the cable slightly at the ringed spot until it separates from the main portion and pull off sheath.

(To Be Continued)

V V

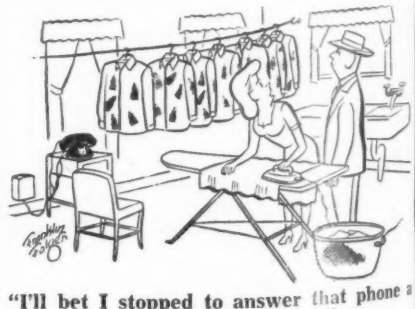
Buys New Mexico Plant

T. J. Anders, formerly with the Leich Electric Co., Genoa, Ill., recently purchased the Chama (N. Mex.) Telephone Co. from the Heron Engineering Co., Denver, Colo.

V V

New York Independent Sold

Stockholders of the Stockwell Telephone Co. recently voted to sell the company to the Chenango & Unadilla Telephone Corp., Norwich, N. Y. Transfer is expected to take place sometime in April.



"I'll bet I stopped to answer that phone a hundred times today."

Iowans Help Small Companies

(Continued from page 42)

prove their plants in order to secure adequate rates.

In an address on "What Is a Fair Return for a Telephone Company," the editor of TELEPHONY deplored the downward trend in the rate of return allowed telephone companies during the past decade or two, and the tendency for telephone rates to lag far behind the general price trends in other lines.

He pointed out that this lag in telephone rates can cause harm in the form of economic damage, undermining the credit position of the telephone industry and its ability to go on functioning adequately in the public service.

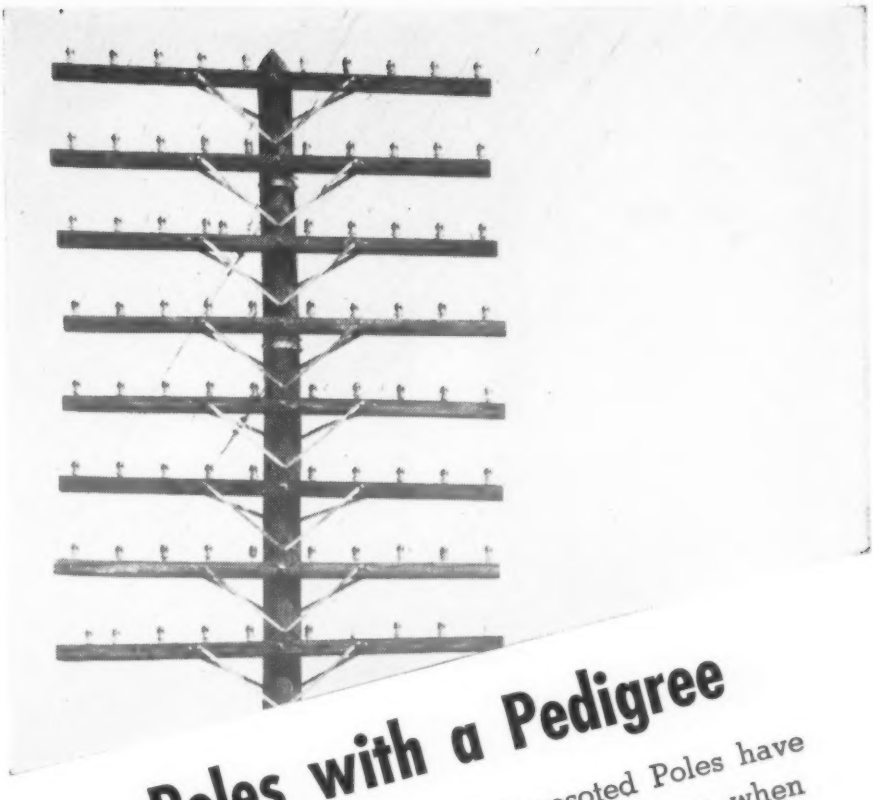
He also pointed to the grave threat to sound operation of telephone companies, particularly the smaller ones, in a period of rising prices caused by the tendency of regulatory commissions to squeeze the allowable profit — the rate of return — to a minimum.

Based on a study of 218 reported rate cases from 1915 to 1929, the downward trend in the rate of return allowed telephone companies was shown. During World War I, the *average* rate of return allowed in these cases was 7 per cent; by 1922 it had risen to 8 per cent; from then to 1930 it again had declined to around 7 per cent. It was stated that by 1936, the *average* rate of return had gone down to 6.25 per cent. But, with the increase in general prices from 1936 to the present time, the *average* rate of return has drifted below 6 per cent, with many commissions today speaking of a 5½ and 5 per cent return as if it were a generous allowance, it was pointed out.

Citing the industry's vital need for new capital, the writer asked the question: "How are telephone companies going to raise the money they need in the face of a historical picture of diminishing return for the investor?" It was recommended that telephone companies request enough of a rate increase, not only to keep their heads above water, but also to attract the necessary credit and capital to take care of much needed plant expansion.

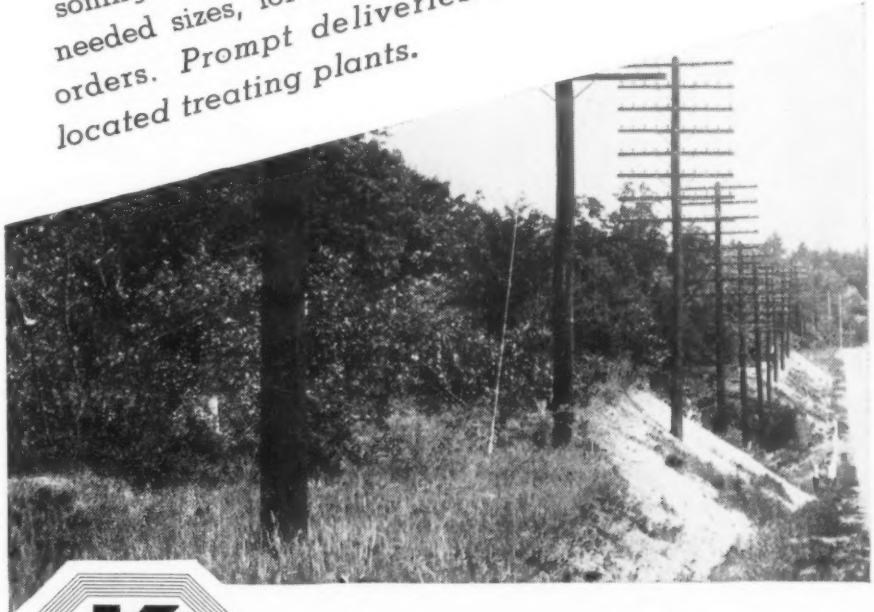
On this point, TELEPHONY'S editor said:

"If a 7 per cent return on the rate base of a telephone company was reasonable in 1929, then why in the world are we talking about a 6 per cent or 5 per cent rate in 1948? We should be talking in terms of 10 per cent, espe-



Poles with a Pedigree

Koppers Full-Length Pressure-Creosoted Poles have the *fundamental dependability* that comes when first quality materials are treated in modern facilities by highly skilled personnel. Large storage and seasoning yards accommodate ample quantities of all needed sizes, for contract treatment or out-of-stock orders. *Prompt deliveries from conveniently located treating plants.*



K KOPPERS

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PITTSBURGH 19, PA.

cially for small Independent telephone companies, and I think any fair economic analysis will bear out such a request."

The last session of the program was given over to a panel discussion on the solutions of the problems confronting small telephone companies. J. C. Crowley, Jr., St. Paul, Minnesota, secretary of the Minnesota Telephone Association, was the moderator. Those participating in the discussion were:

H. C. Amick, Des Moines, connecting company representative, Northwestern Bell Telephone Co.; V. H. Lobaugh, Des Moines, telephone engineer; T. J. Newman, New London, vice president and general manager, Iowa-Illinois Telephone Co.; C. C. Pearce, Riceville, secretary and manager, Farmers' Telephone Co.; M. I. Thompson, manager, Dumont (Ia.) Telephone Co.; J. L. Van Horn, Grinnell, general superintendent, Iowa Telephone & Telegraph Co.; Ross K. Vernon, Sioux Center, manager, Mutual Telephone Co., and Rolla Whitaker, Grinnell, president, Grinnell Cooperative Telephone Co.

Directors re-elected by the convention are: E. G. Bellamy, Knoxville; E. G. Carlson, Creston; Toral Duckett, Sioux Falls, S. D.; L. D. Meyers, Woodbine; L. F. Morrison, Grinnell. Other members of the board are Roy E. Brandel, Mt. Pleasant; C. A. Farrington, Centerville; W. A. Fowler, Pella; T. J. Griffith, Fort Dodge; Clyde McFarlin, Montezuma; H. B. Melick, West Liberty; Don Mong, Newton; W. E. Naylor, Kansas City, Kan.; C. C. Pearce, Riceville, and J. P. Walters, Toledo.

The directors elected the following officers: President, Mr. McFarlin; first vice president, Mr. Bellamy; second vice president, Mr. Pearce, and secretary-treasurer, W. F. Miller, Des Moines.

"You've got me. All I know is he says he picked it up overseas."

Courtesy, Southwestern Telephone News

In the Nation's Capital

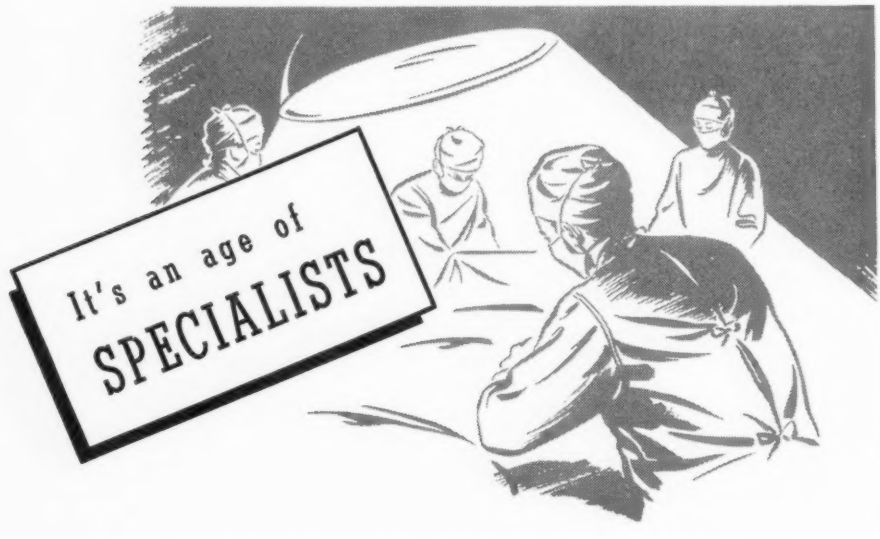
(Continued from page 29)

cial Security Act. On the other hand, the telephone company does not have any right under the contract to hire, discharge, or make arrangements as to hours, wages, or other working conditions of operators working for the operating agents at the agency exchanges. All such affairs are handled by the operating agents at their own discretion and without interference on the part of the telephone company. These operating agents are usually women, many of them married women with families, so that operating help is often procured from within the family circle by having the grown children or relatives help out.

Summing up this situation, the NLRB majority stated in its opinion:

"While the matter is not entirely free from doubt we are of the opinion and find that the agents are independent contractors, and, therefore, without regard to their status as supervisors, are not employes within the meaning of the act. A number of factors and considerations have led us to that conclusion. The arrangements between the parties leave the agents with complete responsibility for the conduct of the agency exchanges, and that responsibility is discharged by them with little, or no, interference by the corporations. The agency agreements provide in essential part for the operation of the agencies on a 24-hour basis, the making of contract orders, and the collection of revenue resulting therefrom; the details of the telephone operations, of the making of the contract orders, and of the manner of collecting the revenue are left to the agents. In short, the employer is concerned with achieving the efficient operation of the exchanges and the rendition of satisfactory telephone service; the method and means by which those results are accomplished are left to the agents. Significant in this respect is the fact that the agents are not required to devote their time exclusively to the affairs and operation of the agency exchanges. In fact, the agency agreements do not even specify the amount of time which the agents must devote to agency work.

"*The fact that the corporations have no right of control over the hiring, disciplining, and discharging of the operators under the agents is, in our opinion, most persuasive. . . .* (Italics supplied.) . . . Moreover, the broad discretionary powers given to its approximately 121 agents by the Southwestern company, with respect to the wages of operators in the agency exchanges, serve to indicate that the agents are engaged in an independent business enterprise. Thus, while the compensation received by the agents is fixed by factors which are almost completely beyond the control of the



We're living in an age of specialists, today. Take the field of medicine, for example . . . one doctor may diagnose, another treat, still another operate. Each is a specialist in his own field. The folks at RUNZEL are specialists, too. Specialists in making cords, wires and cables for the telephone industry. No thousand-and-one items of equipment at Runzel! Just cords, wires and cables—the *finest* cords, wires and cables in the industry.

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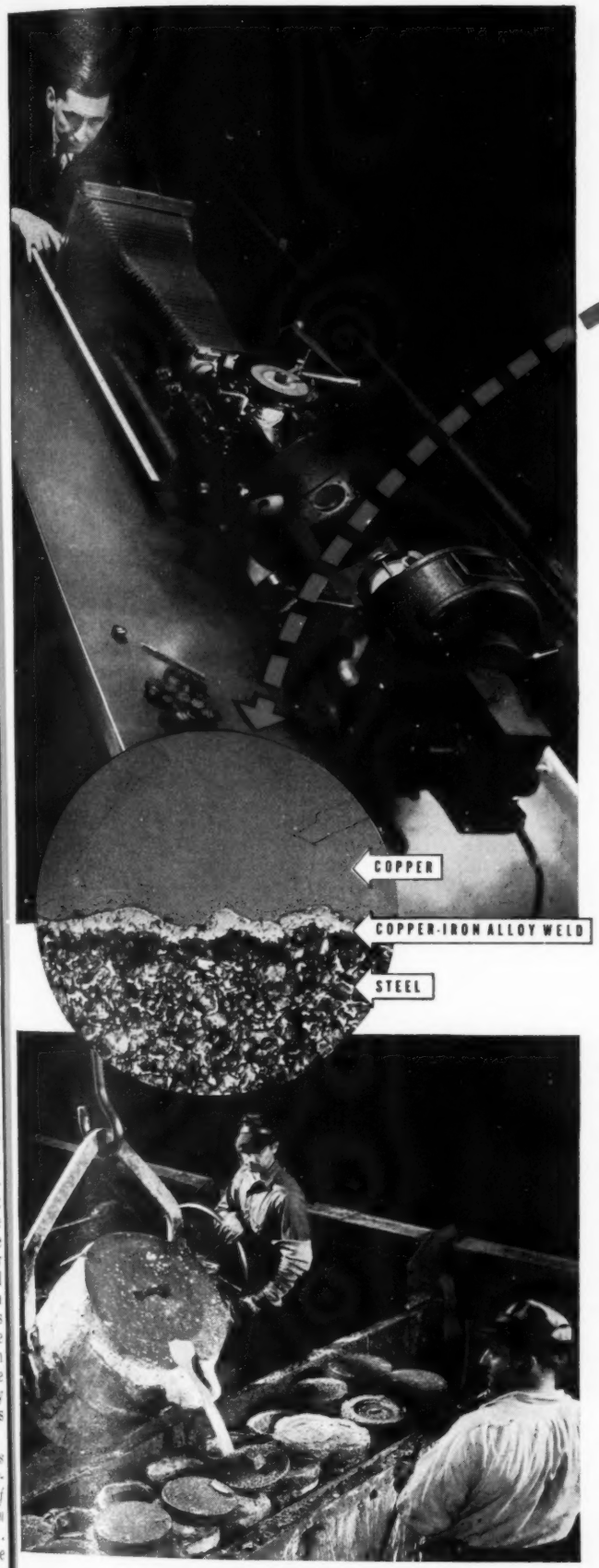

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Copper and Steel are Inseparably Welded by the Copperweld MOLTEN-WELDING PROCESS

Magnified two hundred and fifty times, this photomicrograph of the weld section of Copperweld wire shows a continuous interlocking weld between the alloy steel core and its thick copper covering.

To produce this perfect weld, molten copper is poured around a heated steel billet centered in a mold. Temperatures and casting conditions are critically controlled. As a result of this basic Copperweld operation there is an interpenetration between the copper and the steel forming a permanent molten-weld between the two metals.

The permanence of this metal-to-metal weld is attested by the dependable performance of millions of miles of Copperweld wire installed during the past thirty years—on long span power crossings over ravines and rivers—on vital communication lines subjected to desert sun or Arctic cold—on railroad signal circuits—and on many other applications where the conductivity and corrosion-resistance of copper and the strength of steel are required.

For highest standards of efficiency at lowest annual cost, use Copperweld Products. Engineering data will be sent on request.

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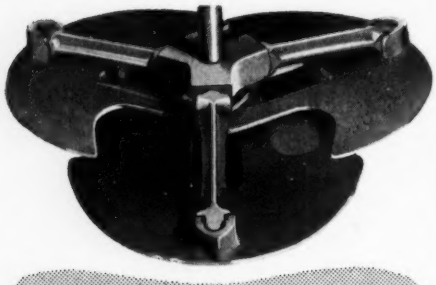

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The preferred anchor of engineers and crews alike for permanent construction and maintenance work. Complete line of sizes to meet every guying problem. Made of tough, rust resistant malleable iron.

Special nut housing locks anchor firmly on rod and prevents rod from slipping through anchor.

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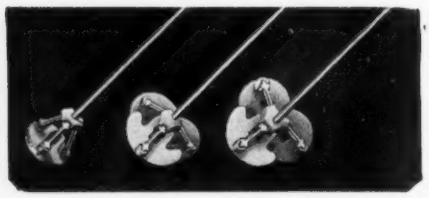

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EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

agents, the amounts which ultimately accrue to their beneficial use are largely determined by whether the agents decide to do the work themselves, or engage others to do it.

"In reaching the conclusion that the agents are independent contractors, we have not overlooked the fact that the corporations make payments on workmen's compensation and social security coverages for the agents and the operators under the agents. This factor is not in itself decisive, since such payments by the corporations may be regarded, for example, as a form of business insurance designed to protect their business interests. Similarly, we do not regard as controlling the power of the two corporations to cancel the agency agreements 'with, or without cause.' The possibility admittedly exists that such powers may be used as a club to force compliance. Nevertheless, the power to cancel does not give to the corporations rights of control as to the methods and means of operating the agency exchanges which are not given directly by the agency agreements themselves. Nor, in our opinion, do the requirements that certain records be kept by the agents, and that reports be furnished in certain instances, constitute control over the methods and means by which the agency exchanges render telephone service.

"From our finding that the agents are independent contractors, it follows that the operators under the agents are not employes of the Southwestern company and the Prescott corporation. Accordingly, we shall exclude from the unit all agents and the operators in the agency exchanges."

Going back to the earlier point as to whether telephone companies which are subsidiaries under common holding company control can be designated as a common employer for purposes of collective bargaining elections, the NLRB majority (and evidently Chairman Herzog was in agreement on this point) stated as follows:

". . . the Southwestern company and the Prescott corporation urge that separate bargaining units should be established for their respective employes, contending that they are separate corporate entities, and that whatever interrelationship exists between them is only of a temporary nature and subject to severance at any time. We do not agree that separate units are appropriate. Both the Southwestern company and the Prescott corporation are engaged in the same business, and are owned and controlled by a single corporation. High managerial and executive positions in both corporations are held by the same individuals. They occupy the same general offices, and utilize the same general office personnel. Labor relations matters affecting both corporations are handled by the same officials.

"The close connection and interrelationship that exist between them are significantly exemplified by the methods used for the administration of the Prescott district and the exchanges of the Prescott corporation, pursuant to which both the Southwestern company and the Prescott corporation perform functions normally within the administrative sphere of the other. The record contains no factual substantiation for the contention that such managerial and operational fusion is temporary. In view of their common interlocking interests, the reflection of those integrated interests here noted, the control of labor relations by the same officials, and on the same basis of the entire record in this proceeding, we conclude and find that the Southwestern company and the Prescott corporation constitute a single employer within the meaning of Section 2(2) of the act. We further find that traffic and commercial department employes of both corporations constitute a single appropriate bargaining unit."

What Were They Talking About?

Commercial — "Just a change of number!"

Engineering—"How much did it cost?"

Traffic — "Doesn't sound like dial tone."

Supply—"Is there an order for it?"

Plant — "Seems expensive for all we got!"

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Pressure treated for strength that lasts!

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The downright usefulness of
This Tool will Amaze You!

When not used as a plier or wrench, jaws can be locked tight on the wire, rod, sheet or other work and hand pressure removed. Jaws can be released by hand holding the tool . . . easily, instantly! Swiveled jaw affords full grip on odd-shaped objects, and this grip is terrific!

Pressed steel body, hardened (replaceable) jaws; 10" $2.25, 7" $1.75. Guaranteed. At your dealer's, or order direct giving his name. Circular free.

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E. G. BROWELL

G. W. SCHOMAKER

Stromberg-Carlson Adds To Sales Staff

T. C. Thompson, Stromberg-Carlson telephone sales manager, has announced two appointments to the company's telephone sales staff.

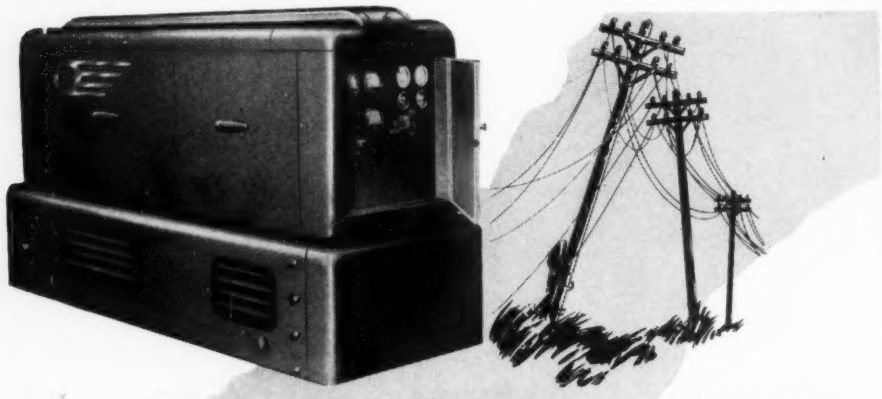
E. G. Browell, carrier systems project engineer, will cover the states of Oklahoma, Arkansas, and southern Kansas, reporting directly to Arthur B. Preble, manager of telephone sales, Kansas City, Mo.

Mr. Browell was born in Regina, Saskatchewan, and was graduated in 1938 from the University of Manitoba with a bachelor of science degree in electrical engineering. He has been employed in the Stromberg-Carlson engineering division the last two years.

He was a radar design engineer in the transmitter division of the General Electric Co. during the war and prior to that was an instructor in electronics at the University of Iowa. He also designed power systems for the United Light & Power Service Co., in Davenport, Iowa.

G. Warren Schomaker, of the Stromberg-Carlson telephone apparatus engineering department, has been advanced to the position of telephone salesman and will cover Kentucky, southern Indiana, and western Tennessee. Mr. Schomaker will report to W. J. Pfaender, manager of telephone sales, Chicago, Ill.

A native of Sydney, Australia, Mr. Schomaker attended Scots College and Sydney Technical College before coming to the United States in 1945. He was employed for four years with the Stromberg-Carlson Co., Ltd., of Australia.



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ONAN STANDBY POWER

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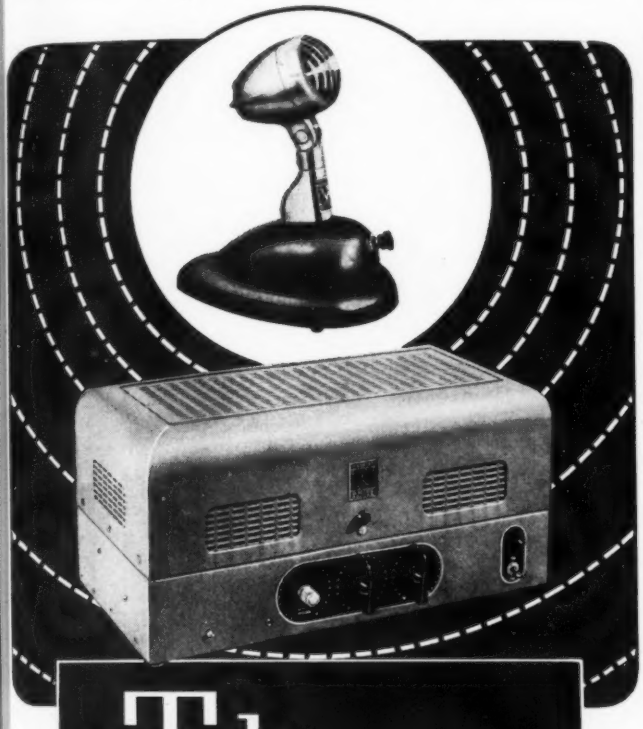
Super Service Station

Locate personnel when you want them!



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● "Telepage," as part of a receptionist's equipment, is a fast and efficient way of announcing visitors or locating personnel who are away from their desks or out of their offices. Calls do not have to be cleared through the board, but are handled by just flipping a key on a "Telepage" unit.

"Telepage" is available in a wide range of models to meet the needs of businesses, large or small. The tone is clear and free from hum or buzz. It is a quality product that gives excellent performance and outstanding service.

"Telepage" systems provide excellent supplementary service and are worthy of recommendation to many of your subscribers.

If you are not fully familiar with "Telepage" write Webster Electric Company, Racine, Wisconsin, for full information.

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RACINE WISCONSIN
Established 1909
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"Where Quality is a Responsibility and Fair Dealing an Obligation"

U·S·S Amertel lines

go up *faster*...stay up *longer*

WHEN you use long-span construction with high-strength Amertel wires, you can often cut your pole requirements by 50%. With fewer poles and fewer connections, lines go up faster with substantial savings in man hours and pole line equipment.

The greater strength of Amertel wires assures a higher factor of safety and greater resistance to heavy ice and wind loads. Maintenance costs on Amertel lines are considerably lower than on lines using E.B.B. wire.

COMPARISON

U.S.S Amertel	Minimum Breaking Strength— No. 12 B.W.G.	Heavy Loading Span length
135 grade	1213 lbs.	350 feet
85 grade	793 lbs.	225 feet
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In addition to high strength, Amertel-85 and 135 wires have increased transmission efficiency at voice frequency. We will be glad to supply you with complete technical data on U·S·S Amertel-85 and 135 as well as the regular grades "E.B.B.," "B.B." and "Steel."

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Anything on spools, drums or reels can be paid out faster and more safely with Simplex Reel Jacks. Right and left hand bases enable operators to lift in sight of each other for easy jacking. "T" shaped base, with 3 threaded and adjustable tie rods, insures a firm, non-rocking foundation. Ask your supply house for full paticulars, or write for Bulletin U-46.

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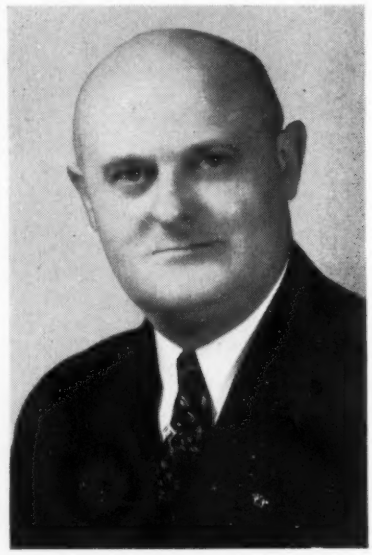
R. H. Burfeind Rejoins Automatic Electric Sales

Announcement has been made by L. H. Warner, president of Automatic Electric Sales Corp., that Raymond H. Burfeind, who retired a year ago from that company to become vice president



R. H. BURFEIND

of National Telephone Co., returned to the Automatic Sales organization on Apr. 1, to become assistant to the president.

Mr. Burfeind, whose intimate knowledge of telephone matters and broad acquaintance among Independent operating executives is widely recognized throughout the industry, will represent the company at telephone conventions, and will devote his time in a staff capacity to customer relations matters.

Mr. Burfeind has devoted his entire career to the telephone business, and practically all of it in the interest of the Independent industry. From 1904 until his retirement a year ago, he had been continuously in the employ of Automatic Electric Co. or its sales affiliates. During this period, he won recognition not only for his contributions to the commercial development of automatic switching but also for his keen and sympathetic understanding of the problems of operating companies, whether relating to technical, commercial or financial matters.

V V

Sargent & Co. Purchases Wm. Schollhorn Co.

Sargent & Co., New Haven, Conn., purchased the operating assets of The Wm. Schollhorn Co., also of New Haven, on Feb. 24.

The sale involved purchase by the Sargent company of the Schollhorn trademarks and patents and the rights to continue the manufacture of the nationally known Schollhorn and Bernard pliers as well as the special-purpose tools that Schollhorn has been supplying to nearly 200 other manufacturers. Among the Schollhorn products used in the telephone field are line construction pliers, long flat nose pliers, cable cutters and long chain nose pliers.

Other familiar products of the 75-year-old concern are pruning and lopping shears, leather punches, paper punches, staple removers and tin snips.

Sargent & Co., a somewhat older concern, is one of the larger manufacturers of builders' hardware and allied products. The company employs several thousand employes and its products are known all over the world.

V V

Shipman New Vice President Navy Industrial Association

James W. Shipman, vice president of Automatic Electric Co., recently was elected regional vice president of the Navy Industrial Association for the area covering Illinois, Iowa, and western Indiana. He is also a trustee of the association, now serving his second three-year term.

Organization of the Navy Industrial Association was inspired by the late Frank Knox, Secretary of the Navy,

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LONG LIFE
Neoprene Jacketed Drop and Bridle Wire
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and continued under the leadership of James Forrestal, his successor and now Secretary of Defense. It is composed of some 475 industrial concerns which are maintaining the working relationships developed during the war between the Navy and its industrial suppliers.

Mr. Shipman has been with Automatic Electric Co. and its affiliated manufacturing and sales companies in executive capacities for many years. His election as vice president of the Navy Industrial Association is a recognition of his contributions to the effective collaboration of these companies with government departments.

V V

Westrex to Handle Export Sales of Gray Audograph

Westrex Corp. (formerly Western Electric Export Co.) a wholly-owned subsidiary of Western Electric, has signed a contract with The Gray Mfg. Co. to merchandise the Gray Audograph and related products in all countries throughout the world, outside of the United States and Canada.

Export sales of the Gray electronic soundwriter will be handled by the same staffs which have been responsible for the distribution of Western Electric motion picture projection and radio broadcast station equipment throughout the world.

V V

Graybar Electric Management Changes

Several changes voted at the recent annual meeting of the voting trustees and board of directors have just been announced by A. H. Nicoll, president, Graybar Electric Co., Inc. G. J. Cossmann, director and district manager at Chicago, was made a voting trustee. A. C. Lamperti, secretary, comptroller, and director, was made a member of the executive committee. R. B. Wilkinson, treasurer, was made a director.

V V

Exide Presents 1,000th Gold Watch for 25 Years' Service

R. C. Norberg, president, Electric Storage Battery Co., recently presented the 1,000th gold watch for 25 years' service, to Miss Caroline Fleck, separator department in the Exide factory at Philadelphia, Pa.

There are 893 living members of The Exide Quarter Century Club, of whom 112 are pensioners and 781 active. Nearly 20 per cent of all Exide employes have been with the company over 25 years, and more than 50 per cent over 10 years.

JOHN LINEMAN OFFERS..

HUBBARD INSULATOR PINS

for

TELEPHONE CONSTRUCTION

In successful telephone construction, many conditions are presented which apparently can be solved only by the use of specially designed insulator pins. The wide variety of Hubbard Insulator Pins insures a satisfactory pin for every construction need.

Hubbard Telephone Pins are furnished with the best grade, properly seasoned wood tops; thoroughly impregnated with paraffin and gauged to a uniform size. Pins are made of high carbon steel with clean threads and square nuts.

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STORM GUY ATTACHMENTS ○ SIDE-WALK GUYS ○ SPAN CLAMPS
LAG SCREWS ○ MESSENGER DEAD ENDS ○ CABLE RACKS ○ BRACES
DRIVE HOOKS ○ EXTENSION ARMS ○ POLE STRUTS ○ GUY CLAMPS
POLE STEPS ○ STUBBING BANDS ○ STRAIN PLATES ○ CABLE SHIELDS
GUY PROTECTORS ○ GUY HOOKS ○ MACHINE BOLTS ○ POLE SEATS
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With separate complete power unit for same, including ringer, coils, chokes, rectifier, batteries, etc. Both units complete $2500.

MAGNETO BOARD— Western Electric. No. 1220. Drop Jack, Brand New (old type keys)—120 lines—35 equipped.

Also — all brand new . . . WAY BELOW COST

STROMBERG CARLSON KEYS— 342M (2 way locking and non locking—hold and ring).

STROMBERG CARLSON JACKS—No. 138—Mtg. No. 80—10 per strip.

KELLOGG JACKS — No. 267—10 per strip.

REPEATER—WESTERN ELECTRIC, Telephone—2 wire—3 repeaters in cabinet—voice frequency type—including amplifying, protection, composite balancing and power equipment for 3 VF and 8 do telegraph circuits.

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